

AN INTERMEDIATE COMMERCIAL GEOGRAPHY

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PART II THE ECONOMIC GEOGRAPHY OF THE LEADING COUNTRIES

WITH MAPS AND DIAGRAMS

NINTH EDITION



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PREFACE TO THE EIGHTH EDITION

WHEN this book was first published it was explained that, as it was intended mainly for use in English-speaking countries, emphasis had been placed on the larger units of the British Commonwealth and on the United States. Subsequently each continental part was expanded and published separately as *A Regional Geography* in five volumes.

Broadly the present rewritten edition follows the original pattern: there is an introductory section on each continent and then a treatment of the constituent countries which emphasizes the larger or more important units. Those readers who wish to find a fuller account of the smaller countries should consult the appropriate volumes of *A Regional Geography*.

The unsettled conditions in so many parts of the world which have existed since the end of the Second World War make it difficult to prepare any revision which is not already out of date by the time it is published. In this revision every effort has been made to meet this difficulty by including the latest information available but retaining some references to pre-war conditions for purpose of comparison.

November, 1954

L. D. S.

NOTE TO THE NINTH EDITION

IN this edition many of the trade diagrams have been redrawn with up-to-date figures and minor changes have been made in the text. With world wide development of nationalism, changes take place with bewildering rapidity but every effort has been made to note the more important developments.

December, 1959

L. D. S.

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AN INTERMEDIATE COMMERCIAL GEOGRAPHY

PART II

CHAPTER I

NORTH AMERICA

Position and Size. North America is the third largest continent, being next to Asia and Africa in size. It has an area of over 9,000,000

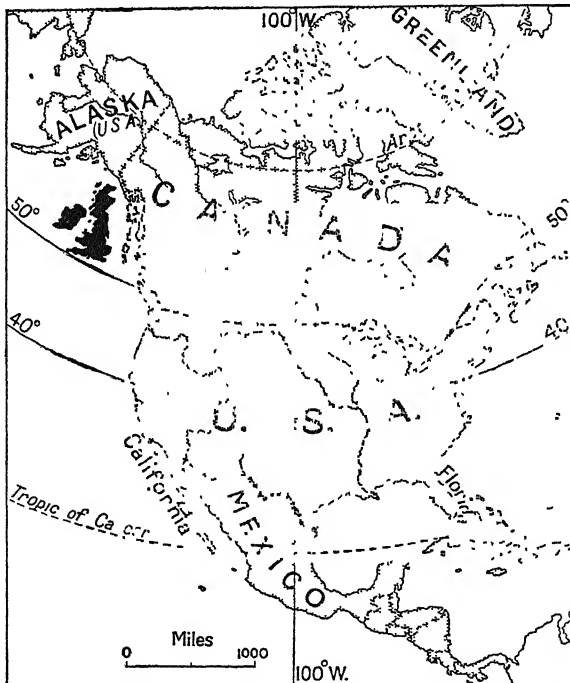


FIG. 1.—The position and size of North America.

The British Isles are shown on the same scale and in their correct latitude.

square miles and is 6,000 miles from north to south. Fig. 1 shows that by far the largest proportion of the continent lies in the north temperate zone and only a small portion—Central America, the

West Indies, and part of Mexico—within the tropics. A comparatively small part of northern Canada and northern Alaska lies within the Arctic Circle. The position of the Arctic Circle and the Tropic of Cancer should be carefully noted. The latter lies to the south of the peninsula of Florida, but just cuts the tip of the peninsula of Lower California. It is useful to remember that latitude 49° N. marks the boundary between Canada and the United States for a considerable distance. Longitude 100° W. roughly bisects the tapering, triangular land mass of North America.

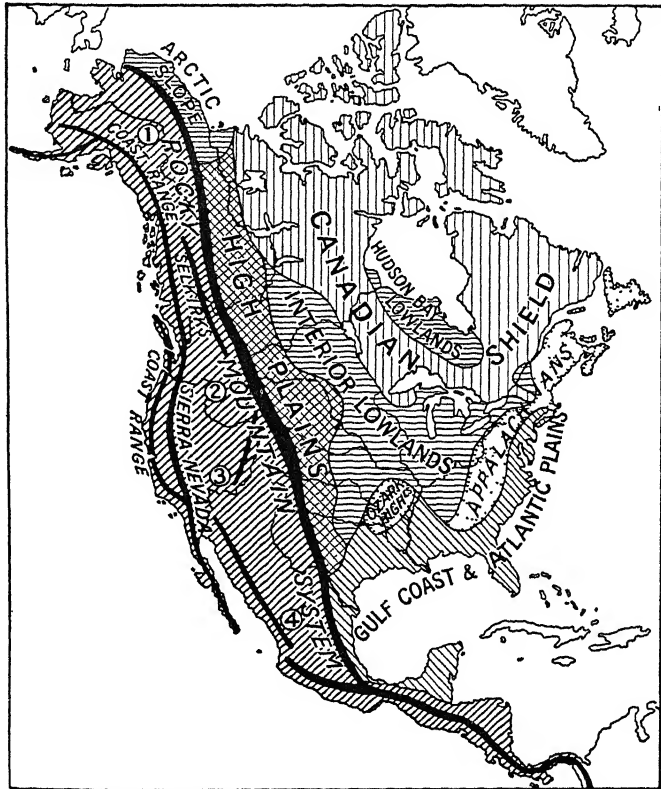


FIG. 2.—The main physical features of North America, showing the physical divisions of the continent.

1=Plateau of Yukon; 2=Columbia Plateau; 3=Colorado Plateau; 4=Plateau of Mexico.

Physical Features. North America falls very simply into three divisions:

1. The Western Mountains, or Pacific Cordillera.
2. The Central Plains.
3. The Eastern Highlands.

The Western Mountain System comprises the whole complex of young folded mountains occupying the western third of the continent. In the north, that is in Canada, the individual ranges are comparatively close together and the intermontane plateaus relatively narrow. The beautiful Coast Mountains are there succeeded by a series of small plateaus, followed inland by the lofty Columbia System and finally by the Rocky Mountains themselves—the highest of all. Farther south, in the United States, the Coast Ranges (which are not continuous with the Coast Mountains of Canada) are separated by a series of valleys including the great valley of California from the Cascades and Sierra Nevada. Between the Sierra Nevada and the Rocky Mountains themselves lies the region of great plateaus. In each case it should be noted that the Rocky Mountains proper form the easternmost range of the whole system. Passing into Mexico the Western Mountain System again becomes narrower and passes finally as a single chain through the Isthmus of Panama.

The Central Plains occupy nearly the whole of the centre of the continent. Although over huge areas the land is nearly flat or only gently undulating, the central plains must not be thought of as *lowland*. There are two great areas of lowland, one round Hudson Bay and one round the Gulf of Mexico. These two lowland areas are nearly connected along the line of the Mississippi and Red Rivers and the region round Lake Winnipeg. But westwards the ground rises very gently and gradually, becoming higher and higher until the foot of the Rocky Mountains is reached.

The Eastern Highlands consist of several detached units—the Appalachian system of mountains; the Plateau of Labrador formed by part of the old Laurentian Plateau (part of the Canadian Shield), and the high Plateau of Greenland. Between the southern part of the Appalachian Mountains and the Atlantic Ocean is an important coastal plain; between the Appalachian system and the Labrador Plateau lies the St. Lawrence valley. The Labrador Plateau slopes gradually from a high edge in the south-east to the Hudson Bay lowlands.

Rivers and Lakes of North America. The great water-parting in the continent is formed by the main crest of the Rocky Mountains. To the west the rivers flow to the Pacific; to the east the rivers drain into the Atlantic or Arctic Oceans. It is convenient, however, to distinguish five groups of rivers:

(a) Rivers draining westwards into the Pacific Ocean—the Yukon in the cold north; the Fraser in Canada; the Columbia with its tributary the Snake, the Sacramento (in California), and the Colorado, famous for its canyon, in the United States. Part of the great Cordilleran plateau region forms an area of inland drainage, and there are numerous lakes, including the Great Salt Lake of Utah.

(b) Rivers draining the Central Plains and flowing northwards into the Arctic Ocean—of which the Mackenzie is the chief.

(c) Rivers draining the Central Plains and flowing into Hudson Bay. The Saskatchewan River and the Red River (not to be confused with the tributary of the Mississippi of the same name) empty into Lake Winnipeg, the outlet of which is *via* Nelson River to Hudson Bay.

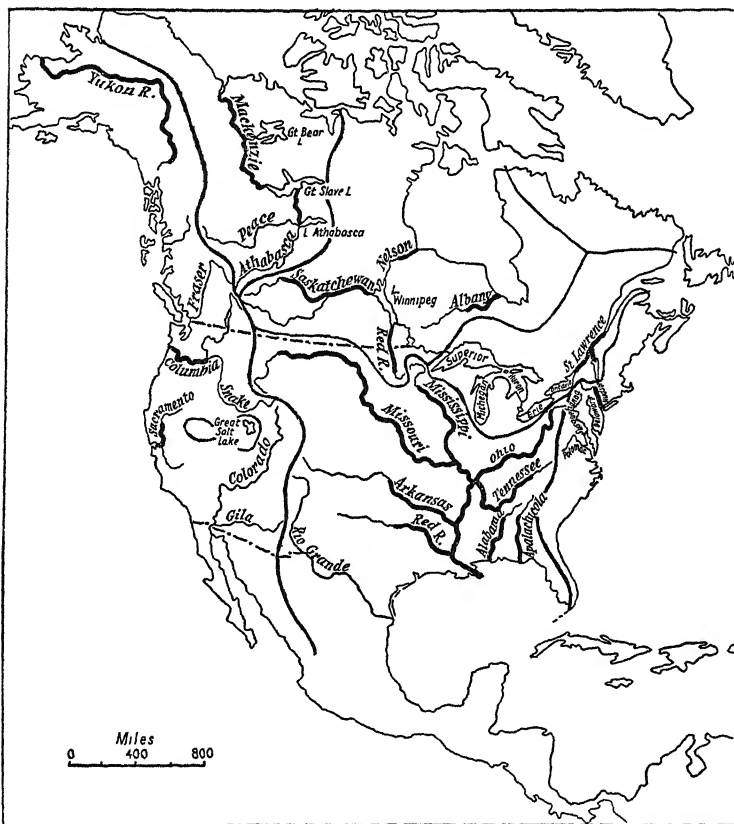


FIG. 3.—The principal rivers of North America.
Navigable portions shown dark.

The continuous lines divide its chief drainage areas. The sections shown as navigable are not necessarily used. Parts of the Peace and Athabasca rivers can be used

(d) Rivers draining the Central Plains and flowing into the Gulf of Mexico. Nearly the whole of the Central Plains in the United States is in the basin of the Mississippi River. On the west its great tributaries are the Missouri, Arkansas, and Red Rivers; on the east are the Ohio and Tennessee.

(e) Rivers flowing directly into the Atlantic Ocean. The Great Lakes—Superior, Michigan, Huron, Erie, and Ontario—are drained by the St. Lawrence River. The rivers down the east coast of the United States are short, but important because they have cut gaps through or into the Appalachian Mountains and afford the easiest routes into the interior. The most important are the Hudson and its tributary the Mohawk, the Delaware, Susquehanna, and the Potomac.

From an economic point of view the rivers of North America may be considered under three headings.

As highways. Although closed by ice from about the end of November until May, the Great Lakes form a series of waterways whose importance to Canada and the United States it would be difficult to overemphasize. A far larger cargo tonnage passes annually through the Sault Ste. Marie (Soo) Canals between Lakes Superior and Huron than through either the Suez or the Panama Canal. The Niagara Falls, between Lakes Erie and Ontario, have been circumvented by the Welland Ship Canal. The St. Lawrence itself is navigable by large ocean steamers as far as Montreal, and since the completion in 1959 of the great ship canal, known as the St. Lawrence Seaway, from below Montreal to Lake Ontario ocean-going vessels have direct access to the Great Lakes. By means of the Hudson-Mohawk gap there is direct canal connection (the New York State Barge Canal) between the Great Lakes and New York. Although the Great Lakes are connected by canal with the Mississippi system, there is little traffic between the two.

The other important water highways of North America are the Mississippi below St. Louis and the Alabama and its tributary, the Warrior, below Birmingham.

As sources of power. The rivers which are important as sources of hydro-electric power may be divided into four groups. In the first place there are those descending from the mountains of the Western Mountain System, more especially important in California and British Columbia. Secondly there are those descending from the Laurentian Plateau in Quebec to the St. Lawrence valley. With this group may be linked the famous Niagara Falls between Lakes Erie and Ontario. Thirdly there are those draining from the Appalachian System to the Atlantic Ocean. The falls on the rivers of the last group were important before the days of hydro-electric power, whilst the site of many of the towns of New England has been determined by the presence of a waterfall whose energy could be used to operate the machinery of the early mills. Fourthly there are the Nelson, Churchill, and other rivers draining into Hudson Bay, which are likely to become important.

As sources of water for irrigation. Irrigation is of great importance

in the dry western States, where no less than 18,000,000 acres—an area equal to half England—were irrigated even as long ago as the period of the 1920 Census. By 1945 this area had increased to 20,500,000 acres of farm land. In the Province of Alberta, on the dry western prairies, irrigation is of steadily increasing importance.

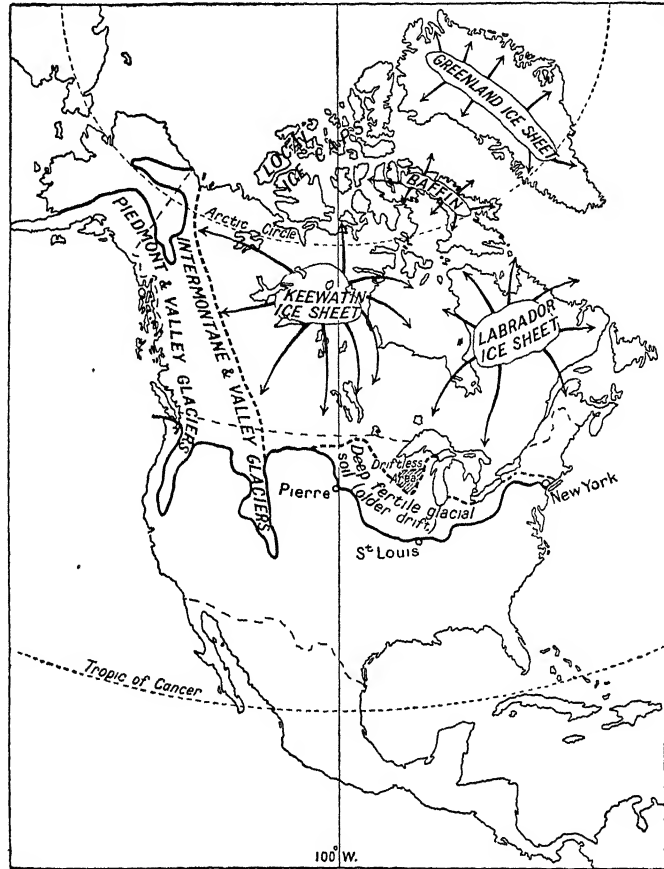


FIG. 4.—The Great Ice Age in North America, showing the area formerly covered by ice sheets.

Geology. The Rocky Mountains proper or the main eastern chain of the Western Cordillera, like most of the great fold mountains of the world, is mainly of Alpine or Tertiary Age. Westwards there are great blocks, often tilted, of much older rocks. The whole Cordillera thus includes a great variety of rocks; there are numerous intrusive masses of igneous rock, especially huge batholiths of granite, and extrusions of lava, and many areas are highly mineralized.

In nearly all parts of the world it is the general rule that oilfields occur on the flanks of great fold ranges such as the Rockies or Andes. This is particularly true of America. The United States, Canada, and Mexico produce more than half of the mineral oil of the world, and the great oilfields are found on both flanks of the Cordillera—on the west in California and on the east in Texas and Oklahoma.

The whole of the north-east of the continent is formed of a mass of old, hard, crystalline rocks. This area is called the "Canadian Shield" (see Fig. 2), and many parts are very rich in minerals—ores of iron, copper, silver, gold, cobalt, and nickel. The Appalachian Mountains are older than the Rockies, and it is on the western side of them that the greatest coalfields are found—*e.g.* in Pennsylvania, West Virginia, and Alabama. Oilfields are also found on the western flank of these mountains. Underlying most of the Central Plains are much younger and usually softer rocks, but the Ozarks (Fig. 2) form an "island" of old rocks structurally a continuation of the Appalachians.

Long after the mountain systems were formed, but many thousands of years ago, North America was much colder than it is now. Nearly the whole of the north of the continent was covered by great sheets of ice. A huge ice-sheet still covers Greenland at the present day. The great ice-sheet which once covered Canada scooped out shallow hollows in the old rocks of the Shield, and so we find all over the north-east of the continent large numbers of lakes, big and small, occupying the hollows made by the ice-sheet. In many places the ice scraped off all the loose soil from the land and crushed up many hard rocks, and so we find large stretches of almost bare rock. The crushed rock was carried southwards and there left behind when the ice-sheet melted. So we find the northern part of the Central Plains is covered with a thick mantle of "glacial drift," which gives place southwards to wind-blown loess. It is the latter which affords extremely fertile soils.

Climate. Temperature. North America is in the Northern Hemisphere, and so January is usually the coldest month. Look at Fig. 5, which is a temperature map for the month of January. The isotherm of 32° F., or freezing-point, cuts right across the continent, so that more than half the continent has a temperature below freezing in January. The line makes a large bend southwards, so that the west coast is much warmer than the east coast. Why should this be? The west coast is kept warm by the influence of the warm North Pacific Drift, a current which flows across the Pacific Ocean from Japan to the coast of British Columbia. Where this current turns south it is actually a *cool* current, but the air from over it blown to the land is warm. The warm, moist South-Westerlies also blow across the ocean and help to keep the west coast warm, but their warming influence is not felt beyond the Rocky Mountain

barrier. Occasionally, however, a warm wind known as the "chinook" (warm because it is descending and becoming compressed) blows down from the mountains to the plains, providing a welcome relief from the intense cold. The centre of the continent is very cold because it is far from the sea; icy winds blow from the Arctic regions, and there is no mountain barrier to hinder them. Compare this with Asia, where the mountains run from west to east and prevent the cold northern winds from reaching India. The east coast of North America feels the moderating influence of the

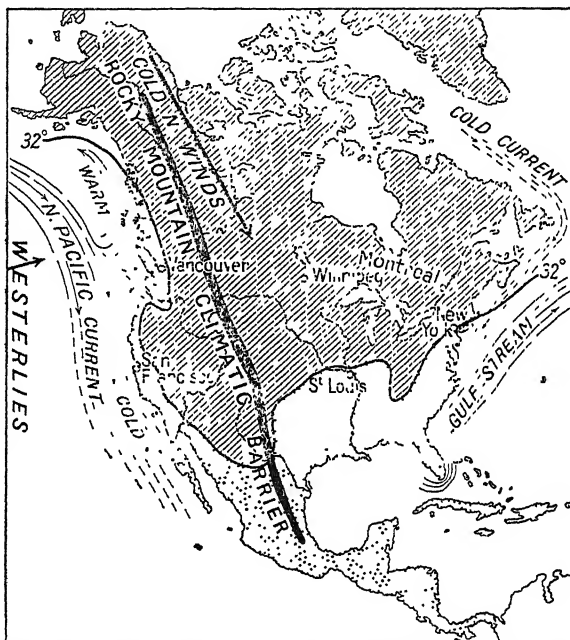


FIG. 5.—The actual average temperatures of North America in January.

sea a little, but the prevailing winds at this season are from the cold heart of the continent. So New York, although in the same latitude as Barcelona or Rome, has an average temperature below freezing-point in January.

Now let us look at conditions in July, when the noon sun is shining vertically over Mexico. There is a small area where the average temperature is more than 90° F. At this season the west coast is kept cool by the influence of cool winds from off the sea, but the centre of the continent gets very hot. Even as far north as the Arctic Circle the temperature is nearly 60° F. On the east coast, the flow of air is mainly from the heated land towards the sea, and New York is nearly as hot in July as the south-west coast of India.

Winds. A large part of North America, lying in mid-latitudes, has its climate and weather controlled by a series of depressions. Although the winds in these systems blow from all points of the compass, the dominant direction is south-westerly, as in Britain, and so, as in Britain, the position of the main mountain ranges on the western side of the land mass very greatly influences the distribution of rainfall (cf. Figs. 7 and 8).

South of about latitude 32° the Trade Winds are blowing and bring rain to the south-eastern part of the U.S.A., the West Indies, and Central America. They are robbed of their moisture in crossing

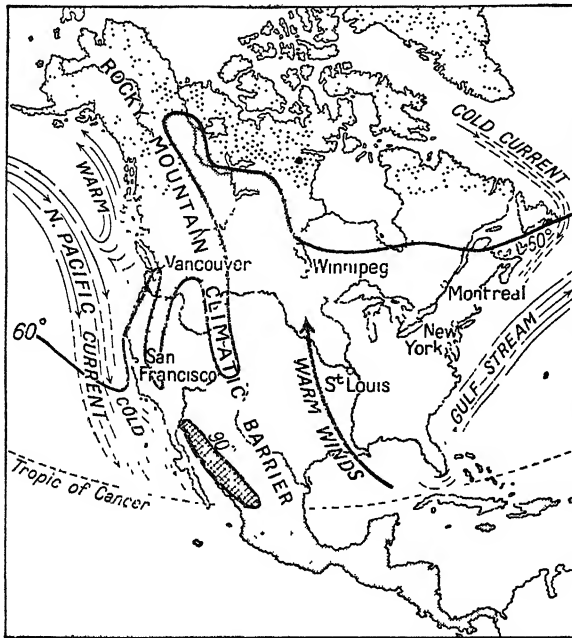


FIG. 6.—The temperature of North America in July.

high land, and so in winter the land beyond the Rocky Mountains is dry. But in the summer the sun makes the plateau of Mexico very hot and a local monsoon blows from the Pacific Ocean. On the west coast, farther north, there is a small but important region where the Westerly Winds blow in winter, but, owing to the swing of the wind systems, not in summer. This region, which centres around San Francisco, has thus a Mediterranean Climate.

Rainfall. The seasonal and areal distribution of rainfall is closely related to the wind systems of the continent and to the fluctuating position of certain fronts. The northern part of the west coast and the Pacific slopes of the Rockies get a good rainfall all the year

round from the South-Westerlies. Many of the deep valleys between the ranges of the Western Mountain System are sheltered from the rainy winds and remain very dry. The heavy rainfall (in winter as snow) is due to the warm winds being forced to rise over the high mountains; and it is heaviest in winter, when the mountains are coldest and the depressions are most intense and most frequent. When the winds reach the Central Plains they are dry, and as they are descending, and so getting warmer, they do not drop any moisture. The Plains thus get most of their rainfall in summer, when they are periodically invaded by masses of warm moist air from the Gulf of

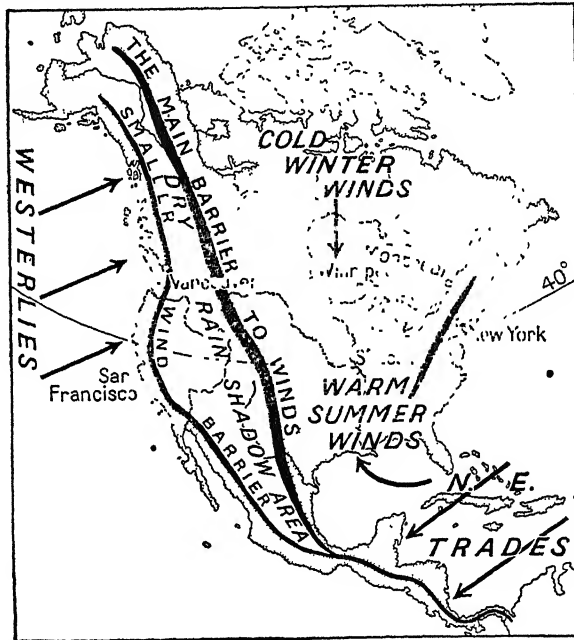


FIG. 7.—The mountain ranges and regular winds of North America.
Compare this map carefully with the rainfall map.

Mexico. These meet cold air from over the north of Canada along a marked front and the warm moist air is forced to rise. In so doing it cools and rain results, often falling in violent thunderstorms. The Mediterranean Region, in California on the west coast, has its rain, of course, only in the winter. The south-eastern States, West Indies, and the east coast of Central America get a good rainfall from the Trade Winds, but the western coasts of Mexico and Central America get most of their rainfall from the local monsoon in summer.

Climatic Regions. *The Tropical Climate.* This climate, with well-marked wet and dry seasons, is found throughout Central America and the West Indies. Owing to the mountainous nature of these

lands there are often great differences (*a*) in temperature owing to elevation, so that hot lowlands, temperate slopes and plateaus, and cold mountains may be distinguished, and (*b*) in rainfall according to exposure to the rain-bearing Trade Winds. Thus the eastern side of the lands (the windward side) and the mountains may be very wet, whilst the western side (the leeward or rain-shadow side) may be so dry as to be almost desert. When the wind blows parallel to a mountain range little rain is deposited.

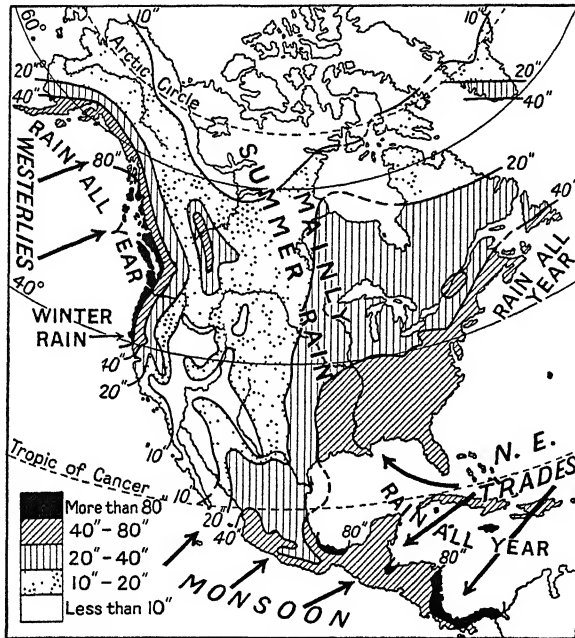


FIG. 8.—The rainfall of North America for the whole year.

Notice very carefully the good constant rainfall where the Westerlies and the Trade Winds are blowing for the whole year. Notice the dry plateaus between the main crest of the Rockies and the coastal ranges (rain-shadow area). Notice how the rainfall decreases from the Atlantic coast inland.

The Warm Temperature or Mid-Latitude East Coast Climate. The south-eastern United States and the Atlantic coastlands as far north as Washington have a climate where the average for January is between 32° F. and 64° F. There is really no true dry season, but a well-distributed rainfall. The average temperature of the warmest month is over 72° F., so there is a considerable seasonal range. To the west, in Texas, this climate becomes gradually drier and with about 20 inches of rain a year evaporation is greater than rainfall. In the United States the area is often called the Gulf Province.

Mid-Latitude Desert Climate. Here evaporation is greater than rainfall. The western part of the High Plains and most of the

Cordilleran plateaus—roughly west of the 20-inch annual rainfall line—are included. Most is semi-desert, but the south-western part is true desert. In the United States two “climatic provinces” are often distinguished—the Plains Province and the Plateau Province.

Mediterranean Climate. This is found over the central valley and southern coastlands of California—a small but important area. Farther north along the Pacific coasts and into British Columbia there is a marked winter rainfall, but no month is sufficiently dry for

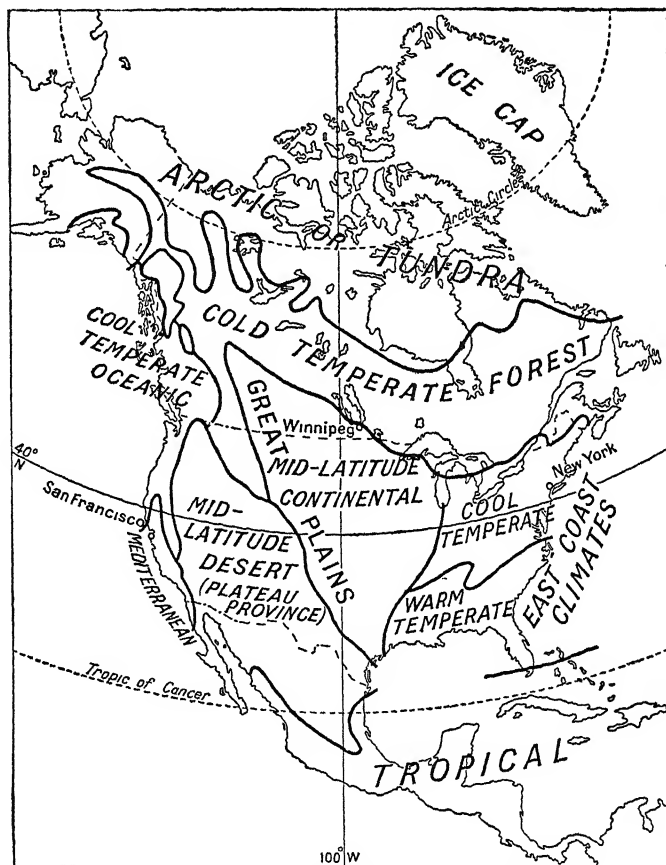


FIG. 9.—The climatic regions of North America.

the climate to be called Mediterranean. United States geographers often distinguish Southern Pacific and Northern Pacific Provinces.

Cool Temperate Oceanic Climate. This, the climate of north-west Europe, is found in the coastlands of British Columbia. It is marked by cool summers and mild winters and a moderate to heavy

rainfall well distributed but with a winter maximum. No month has an average temperature over 64° F.

Mid-Latitude Continental Climate. This is the climate of the Prairies in the heart of the continent, with marked extremes of temperature and a light rainfall, maximum in early summer.

Cool Mid-Latitude East Coast Climate. This occurs in the north-eastern states and in eastern Canada. The extremes are less than in the heart of the continent and the rainfall (or snowfall) very evenly distributed through the year. United States geographers often call this the Eastern Province with a "humid continental" climate. The designation "cool temperate" used on Fig. 9 is not a very good one.

Cold Forest Climate. This is the climate of the great coniferous forests. It is marked by long severe winters and low annual precipitation with a summer maximum. Winter snowfall is not great.

Arctic Climate. Here the temperature of the warmest month is under 50° F. and the winters are 8 to 9 months long and very severe.

Natural Vegetation. Tropical Forests and Grasslands. In the region with a Tropical Climate there is great variation in natural vegetation according to rainfall. The wettest parts of the lowlands have only a short dry season—not long enough to prevent the growth of lofty evergreen forests like those of Equatorial lands. In the drier part some of the species of trees shed their leaves in the hot season and grass grows abundantly. In the driest parts are scrublands with spiny bushes and fleshy-leaved plants.

Warm Temperate Forests in which the long-leaf pine is the most important member of a group of about ten pines are the natural vegetation of the Gulf Plains and Atlantic Plains as far north as Virginia. They still occur on the dry sandy lands and yield valuable timber and such products as turpentine. Along the rivers the pine forests are replaced by the river-bottom forests of cypress, red gum, tupelo, and oaks. Sometimes called cypress swamp forests, the "sloughs" remain under water for much of the growing season, whereas the "glades" are only subject to flooding for limited periods.

The Southern Hardwood Forests in which oaks are the dominant trees originally occupied much of the remainder of the eastern states. In the south-east there is a mixture of the oaks with short-leaf pine, scrub-pine, and pitch-pine: over the Appalachians the oaks are associated with chestnuts and yellow poplar, to the north-west with hickory. Westward the forests stretched up the valleys, whereas grassland (tall grass prairie) occupied the plateaus between.

The North-Eastern Hardwood Forests with beech, birch, maple, and hemlock formerly covered almost the whole of northern New England and the St. Lawrence basin, together with much of the country south of the Great Lakes. In the Maritime Provinces the mixture of conifers gives the "Acadian" Mixed Forest with red spruce, white spruce, and balsam fir.

The North-Eastern Pine Forests (not separately shown on Fig. 10) of jack-pine, Norway pine, and white pine were found in the Lake states—the country to the west of Lake Superior and certain parts south of the Lakes—all of which has been cut over.

The Northern Coniferous Forest forms the huge stretch which reaches right across Canada. White spruce is the chief tree, but in the east balsam fir is important, with white and red pines on lighter

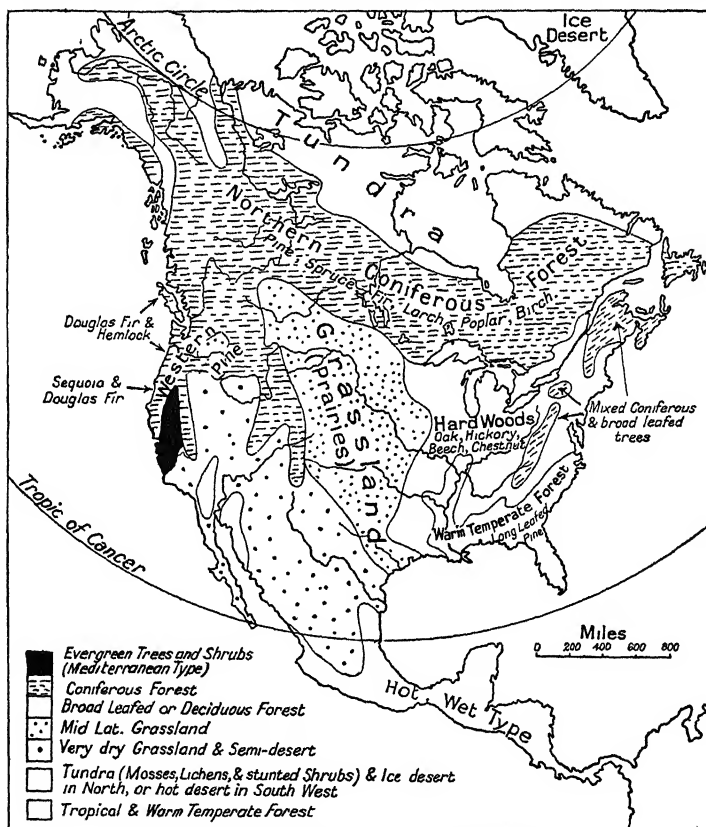


FIG. 10.—The natural vegetation of North America.

soils. Where the forest has been cut over, or has been burnt, aspen poplar is often the most abundant tree, but is really a forest “weed.” This aspen poplar is also very abundant in the grove belt where the forest passes gradually southwards into the prairies. The northern Coniferous Forest also stretches southwards along the higher ranges of the Rockies and Cascades into the United States—with spruce and Alpine fir.

The North-Western Coniferous Forests of the Pacific coastlands in-

clude the wonderful Douglas fir of the British Columbian coastland, the Redwood (*Sequoia*) forests farther south in northern California, and the western white pine forests of the interior ranges of British Columbia and the north-western States. Red cedar and hemlock are also commercially important.

The Western Pine Forests of yellow pine and Douglas fir with sugar-pine and lodgepole pine occupy large areas in the Columbia river basin and other areas.

The Pinon-Juniper Forests consist of small trees and are found especially on the ridges of the Basin and Range Province, described below on p. 64. The areas are too scattered to be shown on Fig. 10.

Chaparral is the typical Mediterranean vegetation of stunted oaks, various other trees and bushes, occurring in the hills and lower mountains of central and southern California.

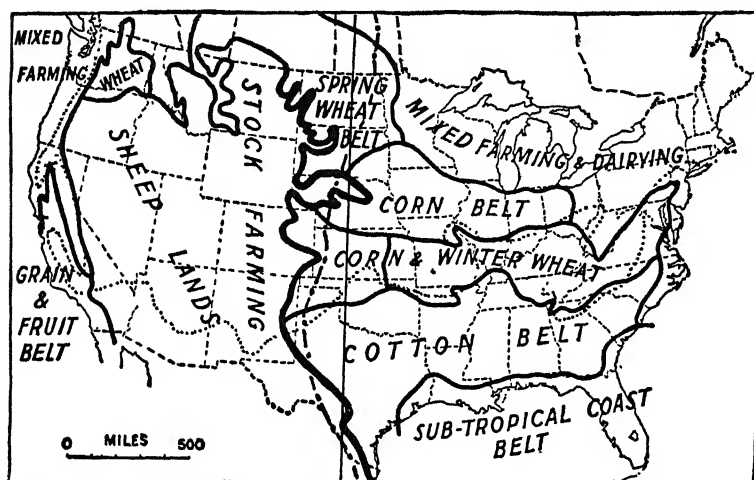


FIG. 11.—The agricultural regions of North America.

The fine line near the centre is the meridian of 100° W.; the line of dots and dashes near it is the rainfall line of 20 inches. The finely dotted line is the limit of 32° F. average actual temperature in January (see also Fig. 5).

Sage-brush is the shrubby vegetation of vast areas of the northern Mid-Latitude semi-deserts—especially the basins of the Basin and Range Province of Nevada.

Creosote bush with various succulent plants is found in the southern parts of the semi-desert areas.

Tall Grass Prairie of luxuriant grasses was the natural vegetation, now entirely cleared, of the wetter eastern parts of the interior lowlands. The Blue Grass regions of Kentucky and Tennessee were "outliers" of this belt.

Short Grass Prairie was found on the drier western interior or High Plains. In the south it gave place to the dry savana of western

and southern Texas, whilst the California valley and the heart of the Columbian plateau were occupied by bunch grass.

The Tundra of the north includes some grassland (Arctic prairies) luxuriant in summer, but much land where the chief plants are mosses and lichens.

Agricultural Regions. In a broad general way the United States and Canada may be divided into a number of agricultural regions. In the United States the meridian of 100° W.—coinciding approximately with the rainfall line of 20 inches per year—cuts the country roughly into a moist eastern half and a dry western half. Nineteenth of the arable land lies east of this line. In Canada the dividing line between the moist east and dry west can be drawn farther west because, though the rainfall there is less, so also is the evaporation during the shorter and cooler summers.

East of the central line from south to north are the agricultural belts shown in Fig. 11:

- (i) The Subtropical coast belt with sugar and rice.
- (ii) The Cotton belt with cotton and maize.
- (iii) The Corn and Winter Wheat belt.
- (iv) The Corn (Maize) belt.
- (v) The Spring Wheat belt in the heart of the continent.
- (vi) The Mixed Farming and Dairying belt of the north-east.

West of the line are found:

- (i) The Grain and Fruit belt of the southern Pacific coast (California).
- (ii) The Mixed Farming and Fruit belt of the Pacific north-west.
- (iii) The Spring Wheat belt of the Columbia basin.
- (iv) The Sheep lands of the intermontane plateaus.
- (v) The Ranching or Stock Farming lands of the Great Plains or Short Grass Prairies.

Population. The native inhabitants are the so-called “Redskins,” or American Indians (Amerinds). They were mostly hunters and roamed over the great grasslands, living mainly on the flesh of wild animals. In Mexico and Central America some of the American Indians, especially the group known as the Aztecs, were much more highly civilized and built themselves fine cities. The existence of the northern part of North America was probably known long ago to the Norsemen, but when we talk about the discovery of America by Europeans, we refer to the discovery of the West Indies in 1492 by Columbus. Columbus was seeking a new route from Europe to India, and thought the new land he had found was really part of India. After the voyage of Columbus, many adventurers sailed to explore the new lands but it was South America rather than North America which attracted them because of the stores of gold both in wrought form in cities and also in mines. It was later, as mentioned

below, that Europeans went to settle along the east coast of North America. Frenchmen settled in the north, and so French is still the language of Quebec; Englishmen settled farther south, and from these latter settlers has arisen, what may claim to be in many respects, the greatest republic in the world—the United States of America.

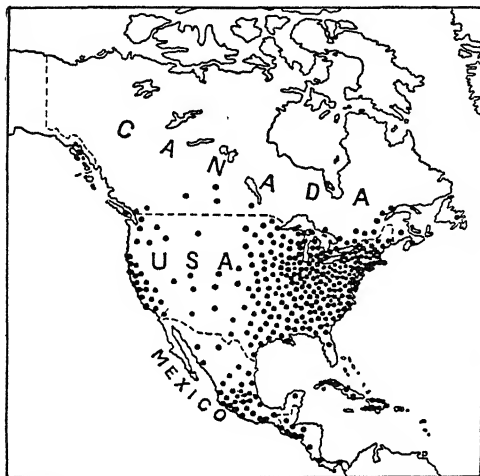


FIG. 12.—The population of North America.

Each dot represents 500,000 (half a million) people.

At the present day Canada, now including Labrador, stretches right across the north of the continent. The United States of America stretches right across the continent to the south of Canada. Alaska, in the north-west, belongs to the United States. The United States of America has also the principal right over the land on either side of the Panama Canal, and also owns Puerto Rico. Mexico is a large republic south of the United States. Central America is divided between six small republics and the British Colony of British Honduras. The largest West Indian island of Cuba is a republic. The large island of Haiti or Hispaniola is divided between two negro republics; the island of Jamaica and most of the smaller islands of the West Indies belong to the British Commonwealth.

CANADA¹

Position and Size. Canada stretches from the United States boundary to the North Pole and occupies the whole of the North American continent north of the U.S.A. except Alaska in the west, the great ice-capped Danish island of Greenland in the east, and the two tiny French islands of St. Pierre and Miquelon off Newfoundland. Its area, including lakes, is about 3,850,000 square miles, or considerably larger than the United States including Alaska. The only country which is larger is the U.S.S.R. with an area of about 8,600,000 square miles. However, actual area means little, since huge tracts of central and northern Canada are entirely uninhabited and will probably always remain so. It has been estimated that only between 10 and 20 per cent. of the country could be permanently settled.

This vast country stretches from longitude 141° W. (which is the boundary with Alaska) to 52° 36' W. near St. John's in Newfoundland, which is nearly one-quarter of the way round the world. It is less than 2,000 miles across the North Atlantic from Newfoundland to Ireland, but over 3,500 miles from Newfoundland to the Pacific coasts of British Columbia. The southernmost part of Canada, near Windsor (Ontario) in the Lake Peninsula, is in latitude 43° N., whilst for the western half of the country the boundary between Canada and the United States is latitude 49° N. Thus practically the whole country lies either in the cooler northern part of mid-latitudes or within the Arctic Circle. The habitable part is mainly a strip along the southern border. On the east lies the Atlantic Ocean, but only the southern coastlands of the Maritime Provinces and Newfoundland are ice-free through the year. On the west lies the Pacific Ocean, always ice-free; on the north is the enclosed Arctic Ocean, ice-bound for most of the year.

Provinces. Canada comprises ten provinces together with Yukon Territory and the Northwest Territories. Previously separate colonies of Britain, the country as a unit came into existence in 1867 and then consisted of Upper Canada (Ontario), Lower Canada (Quebec), New Brunswick, and Nova Scotia. Manitoba was added in 1870, British Columbia in 1871, Prince Edward Island in 1873. Later, the provinces of Alberta and Saskatchewan were organized as separate units and joined in 1905. For long Newfoundland was a separate colony, later a self-governing dominion, but found difficulties in financing itself and joined the federation in 1949 as the tenth province. The capital of Canada is *Ottawa*, and the country is

¹ The name of the country is now officially "Canada." For certain purposes in the past the expression "Dominion of Canada" was used, and July 1st is celebrated as Dominion Day, called by French Canadians *Jour de la Fédération*.

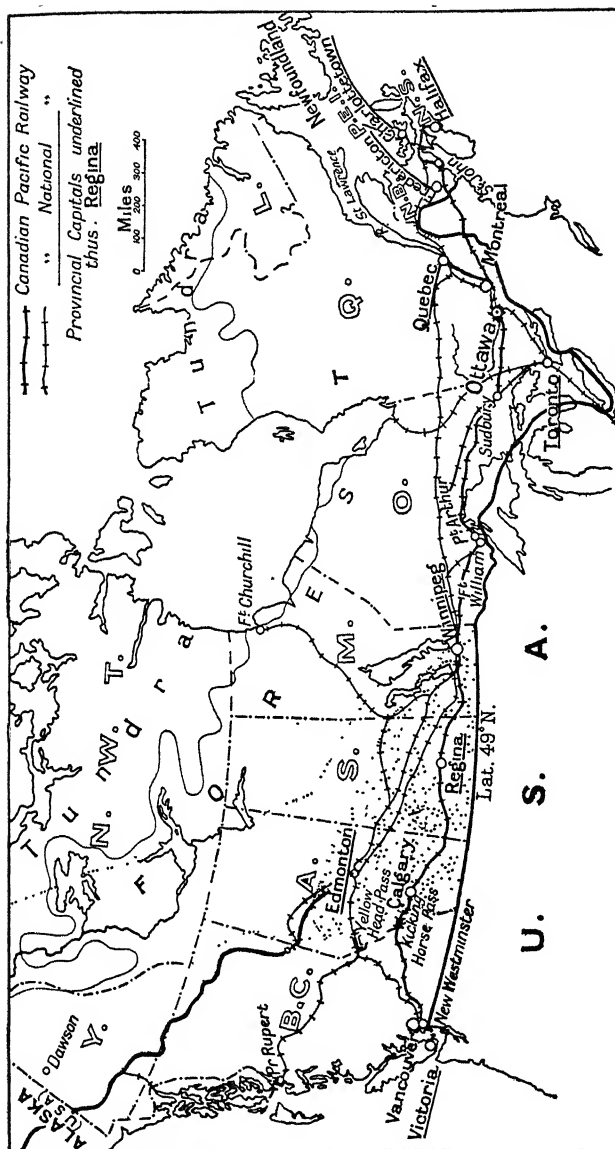


FIG. 13.—The provinces of Canada and their capitals. The Alaskan Highway is shown by a heavy black line. Capital letters indicate the names of provinces. A fine line shows the southern limit of the tundra, fine dotted lines the limit of the Shield and the Rockies. Prairies are stippled. Whitehorse is now the capital of Yukon, St. John's of Newfoundland.

governed by a Governor-General with a Senate and House of Commons. Each province has a Lieutenant-Governor and an elected parliament.

The following table is for reference. The Northwest Territories have been provisionally divided into three parts.

TABLE OF AREAS AND POPULATIONS

	Area in square miles	Population			
		1921	1931	1941	1951
Canada (Ottawa)	3,606,551 ¹	8,788,483 ²	10,374,196	11,506,655	14,009,429
Prince Edward Island (Charlottetown)	2,184	88,615	88,038	95,047	98,429
Nova Scotia (Halifax)	21,068	523,837	512,846	577,962	642,584
New Brunswick (Fredericton)	27,985	387,876	408,219	457,401	515,697
Quebec (Quebec)	594,860	2,361,199	2,874,255	3,331,882	4,055,681
Ontario (Toronto)	412,582	2,933,662	3,431,683	3,787,655	4,597,542
Manitoba (Winnipeg)	246,512	610,118	700,139	729,744	776,541
Saskatchewan (Regina)	251,700	757,510	921,785	895,992	831,728
Alberta (Edmonton)	255,285	588,454	731,605	796,169	939,501
British Columbia (Victoria)	366,255	524,582	694,263	817,861	1,165,210
Yukon Territory (Whitehorse)	207,076	4,157	4,230	4,914	9,096
Northwest Territories —		7,988	7,133	12,028	16,004
Franklin	554,032				
Keewatin	228,160				
Mackenzie	527,490				
Newfoundland (St. John's)	42,734	284,872 ³	315,649 ⁴	5,528 ⁴	361,416
Labrador	112,630	4,716 ³			
Total	3,845,774				14,009,429

¹ Land Area. Out of the total area ascribed to Canada 239,223 sq. miles is water (lakes, etc.).

² Including 485 belonging to the Royal Canadian Navy. ³ 1935. ⁴ 1945.

Population totals exclude Newfoundland and Labrador before 1951.

Each of the provinces has its own problems, but the country is kept together by the central government and by rail and air.

The Relief of Canada. The ordinary physical relief map of Canada in an atlas gives but a poor idea of the outstanding physical features of the country because the gradual rise westwards of the great plains to a height of 4,000 to 5,000 feet masks the really sudden rise to the Rocky Mountain wall. In the same way the Canadian Shield, so essentially a unit, appears in an atlas partly as a plain, partly as a plateau.

As shown clearly in Fig. 14 the fundamental division of Canada is into (a) the Western Cordillera, (b) the Central Plains, including the High Plains and the Interior Lowlands, (c) the Canadian Shield, (d) the Arctic Islands, (e) the St. Lawrence Lowlands, and (f) the Canadian Appalachians, and we will now consider some subdivisions.

The Western Cordillera. Averaging some 500 miles wide, this complex of mountains and plateaus with some deep valleys occupies the whole of British Columbia and the Yukon with the addition of some strips of Alberta and the Northwest Territories. It consists of a number of units, all running roughly parallel to the coast:

- (a) Vancouver Island Range and Queen Charlotte Islands,
- (b) the depression of the Strait of Georgia and the Inside Passage — a trough including lowlands on the eastern side of Vancouver Island and neighbouring islands in Georgia Strait and Puget Sound,

- (c) the British Columbian Coast Mountains, with granite masses,
- (d) the Interior Plateaus and Ranges, with a few important valleys in the south,
- (e) the Northern Rockies with the Rocky Mountain Trench and the Selkirk and Purcell Ranges (Columbia System) as well as the Rockies proper.
- (f) the Foothill Belt.

The Central Plains. These extend from the mouth of the Mackenzie in the extreme north, where they are relatively narrow, to the forty-ninth parallel, where they have widened out to 800 miles. They consist of monotonous plains; in the south three prairie levels or steps are recognized. The first step lies to the west

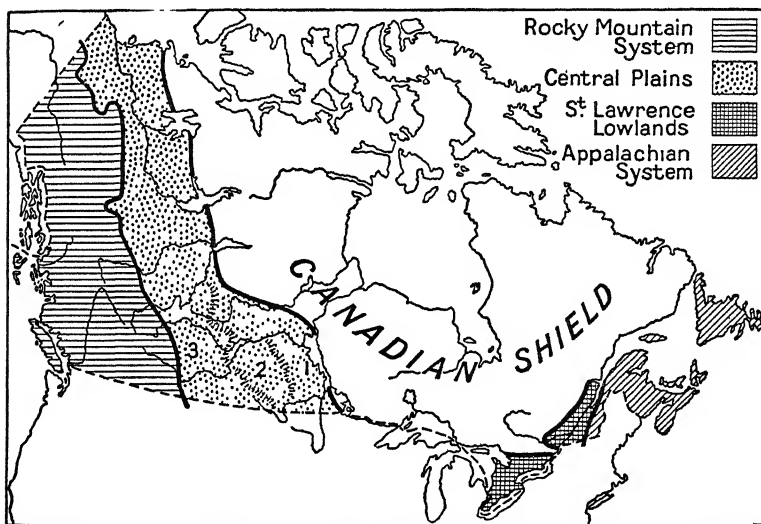


FIG. 14.—The regions of Canada

The figures 1, 2, and 3 mark the First, Second, and Third Prairie levels.

The Canadian Arctic Archipelago, often very mountainous, should be separated from the Shield. and south of Lake Winnipeg and is alluvial plain occupied by the former Lake Agassiz. The escarpment on to the second level which has a rolling surface, is from 500 to 700 feet high. The third level has a still more irregular surface with scattered flat-topped hills and gorge-like river valleys.

The Canadian Shield. Except in the east or along the upturned southern and south-eastern edges (Laurentian Mts. or Laurentides), where heights of 2,000 to 3,000 feet are reached, the whole of the Shield is a vast lake-strewn, saucer-shaped plain, passing into clay lowlands around Hudson Bay and in northern Ontario.

The St. Lawrence-Great Lakes Lowlands. These form a dis-

continuous stretch from the tip of the Lake Peninsula near Windsor, to the St. Lawrence valley at Quebec.

The Canadian Appalachians. This is a continuation of the Appalachians of the eastern United States. The folding gives rise to a "corrugated" appearance with long narrow ridges and deep valleys. This is well seen in Nova Scotia. In other parts (Gaspé) the ridge and valley structure is less marked and this is true of the Eastern Townships of southern Quebec.

Minerals. Canada is one of the world's great producers of minerals. Because of the vast areas of the Canadian Shield and the northern parts of the western Cordillera only partly explored, new mineral deposits are constantly being found and so it is quite possible for Canada to become the world's leading producer of many minerals. On the other hand, when a deposit of gold or other metalliferous ore is worked out, it cannot be replaced, and so even a young country such as Canada already has its "ghost towns" like Klondike in the Yukon, which flourished only so long as the minerals remained to be worked.

Each of the great regions of Canada has its minerals. Many parts of the Canadian Shield are highly mineralized and there we find ores of many metals. In the rocks of the Canadian Appalachians we find both metallic ores and coals in different areas and the same is true of the Cordilleras in the west. Under the Prairies are stores of coal, oil, and natural gas. The St. Lawrence-Great Lakes Lowlands are comparatively poor in minerals, but even these have large deposits of salt, limestone, and other industrial resources.

In recent years the most valuable mineral products obtained have been gold, nickel, copper, coal, oil and natural gas, zinc, lead, silver and asbestos. Uranium is now very important.

Coal. Although Canada has some vast reserves of coal, more than half the coal used in the country is imported from the United States. The best coals are those from Nova Scotia, especially the Sydney Field, which is located in the extreme east and has many of its coal seams running under the sea. The coal is unfortunately a long way from the industrial regions of southern Ontario and so much of it is shipped along the coast, even to the United States, whilst Ontario gets its coal from across the Great Lakes from the United States fields in Pennsylvania. There are other small fields in the east, including New Brunswick. From there it is more than 2,000 miles west to the fields on the borders of Alberta and British Columbia, with little or no good coal in between. There coal is worked near Crow's Nest Pass and along the foothills belt. There are also small fields along the West Coast—on Vancouver Island at Nanaimo. Underlying the Prairie Provinces of Alberta and Saskatchewan there are vast fields with brown coals, semi-bituminous and some bituminous coals scarcely touched. These may one day be used,

but they are not at present usable for making coke needed in industry and are a very long way from any industrial centres. Total production of Canadian coal has remained comparatively steady—since 1912 it has only fluctuated between $13\frac{1}{4}$ and about 20 million tons. Formerly, Nova Scotia produced about half, but this share has fallen to a third as Alberta has become the leading producer. It must not be forgotten that installed hydro-electric development represents a saving of some 30,000,000 tons of coal a year.

Oil and Natural Gas. It has long been thought that the belt of oilfields found west of the Rockies in the United States might extend into Canada. Oil has been known for many years in the far north in the Mackenzie Basin, and a field was developed at Norman Wells in the Northwest Territories in the Second World War. In the McMurray region of the Athabasca River are bituminous sands from which huge quantities of oil may one day be extracted if an economic process can be developed. Until recently, most of Canada's oil came from the Turner Valley Field near Calgary, but the discovery of oil in quantity at Leduc and later Redwater and Pembina shifted the focus to the Edmonton district and altered the whole importance of oil in Canada's future. It is not too much to say that the discovery of the oilfields in Alberta and the construction of a pipe-line to the Great Lakes and across the Rockies to Vancouver altered the whole of Canada's economic position.

Natural gas deposits are widespread through the same prairie belt and gas is piped from the Peace River field to Vancouver.

Gold. Gold was discovered in the Thompson River of British Columbia in the 1850's, and in 1858 was the great gold rush to the Fraser River. The discovery in 1896 of rich stream deposits in the far north-west, in the creeks of the Klondike River near where Dawson City now stands, gave rise to the amazing gold rush of '98—perhaps the greatest gold rush in history—when thousands trekked over the snowy mountain trail and made rafts to journey the 500 miles down the Yukon River. A remarkable mountain railway was built from Skagway, the Alaskan port of entry. The peak of production was reached in 1900, after which came a steady decline. However, this decline was more than offset by the discoveries of lode gold in the Canadian Shield of Ontario—the leading province since 1914. The large mines of Porcupine (Timmins) and Kirkland Lake are but two of many which have gone on yielding steadily. There are also several large producers in Quebec, notably at Noranda-Rouyn. Since 1938 there has been an important mine in the Northwest Territories at Yellowknife. British Columbia continues to have a good output from a group of mines including Bridge River and Hedley.

Nickel. In some years Canada has produced as much as 85 per

cent. of the world's total. Nearly all comes from the nickel-copper ores of Sudbury (Ontario), with a little from the Cobalt district.

Copper. In addition to the Sudbury deposits, copper is obtained in several areas of Quebec and British Columbia.

Lead and Zinc. The famous silver-lead-zinc ores of the Kootenay district of British Columbia are smelted at Trail, but there are also various workings in eastern Canada.

Silver. Silver is obtained from British Columbia, in copper-gold-silver or silver-lead-zinc deposits, also from the famous old silver-cobalt ores of Cobalt (Ontario) and nickel-copper deposits of Sudbury.

Other Metallic Minerals include ores of silver, radium, and uranium at Great Bear Lake, cobalt (Cobalt, Ontario), and platinum. One of the world's largest deposits of titanium has been found in Quebec and others in Labrador.

Iron Ore. It was long thought that the Canadian Shield had no deposits to rival the iron ore of the Mesabi Range and other places just across the border in the United States, but discoveries in the Ungava district of northern Quebec and in Labrador have revealed high-grade haematite deposits with many millions of tons of fine ore. The development needed the construction of roads and railways (which were put in hand after the Second World War) since the deposits are 350 miles north of the St. Lawrence. Other important deposits of iron ore are found in Newfoundland (Bell Isle or Wabana near St. John's) and also near the north shore of Lake Superior. Production of iron ore in Canada jumped from 7,000,000 tons in 1954 to 17,000,000 in 1955.

Cement is made in the St. Lawrence Lowlands, in Alberta near Banff, and other places.

Asbestos. The open-cast mines in the Eastern Townships of Quebec near Black Lake and Thetford yield a large proportion of the world's supply. In some years Canada has produced over 80 per cent. of the world's total.

Fluorspar, graphite, dolomite, mica, salt, and sulphur are amongst the many other minerals which Canada produces, whilst fine building stones, such as granite in the Eastern Townships, are also quarried.

Climates. Read again what is said about the climatic conditions of North America and it will be clear that the weather in Canada is largely the result of opposing air-masses. There are the cold masses originating in the Arctic which invade the country from the north, there are the warm moist masses originating in the Tropics which invade the country from the south. Along the "fronts" where the air-masses meet there are gales, sudden changes of temperature and much rainfall and snowfall. In the winter the cold masses may extend their influence right to the Gulf of Mexico; in summer the warm air masses may cover the whole prairies and extend right to the Arctic itself.

In British Columbia the prevailing on-shore winds bring rain and maintain an even temperature throughout the year, whereas in eastern Canada the prevailing winds are *off-shore* and hence the much greater contrasts between summer and winter. But all large bodies of water temper summer heat and moderate winter cold and this is well seen along the shores of Lake Erie or Lake Ontario.

Natural Vegetation and Forestry. Out of the total land area, forests cover approximately 1,345,840 square miles or 37 per cent. of the land area of Canada though more than a third is officially recorded as non-productive scrub and nearly half of what is left is described as inaccessible. So much of the forest area has already been worked over that there is a larger tract classed as "young growth" than there is of merchantable mature timber. Nevertheless, Canada probably has a greater reserve of softwood timber than any country in the world except Russia.

The Lumber Industry. Merchantable timber (trees more than six inches in diameter) is estimated to cover some 392,000 square miles, but only about a quarter of this is accessible "saw" timber suitable for lumber. British Columbia is easily the chief producing area (one-third to one-half of the world) and most of the remainder is from eastern Canada (Quebec and Ontario). The forests in the north of the Prairie Provinces are mainly for local supply. Spruce, Douglas fir, and white pine are the most important softwoods. The British Columbia timbers are Douglas fir, Western hemlock, Sitka spruce, and cedar; white pine and white spruce are from the east. The output of hardwoods, notably yellow birch and maple from the east, is only one-twentieth that of softwoods. In addition to lumber there is a huge output of railway sleepers (especially of tamarack), pit props, telegraph poles, posts, and firewood. Plywood is now very widely used in building as well as in furniture-making; the newer varieties of plywood with a plastic binding material instead of glue can be used for outdoor construction, whilst other types have a metal facing.

The Pulp and Paper Industry. Paper is made from a variety of vegetable fibres reduced under water to a fine pulp and bleached by e.g. chloride of lime. Cheap paper for newspapers (newsprint) and wrapping papers can be made by just grinding the wood; hence the term mechanical pulp. Most papers are now made from chemical pulp, the wood being digested by chemicals, an acid solution of calcium and magnesium bisulphite, or with caustic soda. A successful pulp and paper industry needs (a) a large and continuous supply of softwood timber, such as spruce; (b) cheap power, since much is used in grinding the timber and in other processes; (c) abundant water; (d) cheap and efficient transport for the supply of raw materials including chemicals and the distribution of the pulp or paper. These conditions are well satisfied along the fringes of the

Canadian Shield in Ontario and especially Quebec, in Newfoundland and elsewhere in eastern Canada. In the west the industry is growing. More than four-fifths of Canada's output is taken by the United States. The better qualities, made also from the softer hardwoods such as poplar, are in demand for magazine printing. There is also a huge consumption of cardboard for packing, various wrapping papers, and sheets made of pulp and used in building.

The United States has the world's largest consumption per head, and not only consumes the whole home production, but takes four-fifths of Canada's output. Canada's annual consumption of wood for pulping is over 600,000,000 cubic feet. The industry is centred at present along the southern fringe of the coniferous forest tract in eastern Canada. The innumerable lakes and rivers of the Canadian Shield afford the water which is so necessary, and the region is conveniently near the great industrial districts of the United States.

Three stages of production may be distinguished—the cutting of the pulpwood in the forest, the manufacture of pulp, and the manufacture of paper. The three operations may, but not necessarily, be carried out in separate regions. The export of pulpwood has remained practically stationary for many years, but there has been an enormous increase in the manufacture and export of pulp and paper.

Canada is easily the world's largest exporter of lumber (40 per cent. of world total) and newsprint (80 per cent.) and comes second in exports of pulp and plywood

Forest Policy. It is estimated that 60 per cent. of the original forests of Canada have been destroyed by fire, 18 per cent. have been cut for use, 22 per cent. thus remain, and this reserve is being used up very rapidly. Unless regeneration is carefully assisted, valuable forest tends to be replaced by a useless growth of such forest "weeds" as aspen poplar. Annual increment of good lumber is not yet balancing the annual consumption, though much planting and careful regeneration is undertaken.

Wild Animals and the Fur Trade. For at least a century and a half during the French régime, the fur trade was the chief reason for European interest in Canada, and the search for fur-bearing animals, or Indians willing to trade furs, was the main incentive in the exploration of the country. The Hudson's Bay Company, still extremely active, was originally the "Adventurers of England Trading into Hudson's Bay" and obtained in charter in 1670; for long fur-trading was its principal business. The opening of the country has driven the wild fur-bearing animals even farther and farther away, and the number of pelts, though still several millions a year, has naturally decreased. The main centre of collection is Winnipeg; three-quarters of the pelts received are muskrat, but ermine, beaver, mink, skunk, and fox are important. As the difficulty of finding and trapping wild animals increased, the number of fur farms multiplied

but suffered a severe setback during the Second World War. The animals kept are the savage little mink (90 per cent.) and the fox—especially silver fox and, more recently, platinum fox. One advantage of fur-farming is that the animals can be humanely killed, without damaging the fur, exactly when the fur is in best condition.

Fisheries. Fishing is undoubtedly the oldest industry in Canada followed by Europeans—it brought the early Norsemen to the Grand Bank of Newfoundland in pre-Columbian days, whilst the Bretons were making annual voyages there long before the days of Champlain. The fishing grounds are as extensive as those of any country in the world.

The Atlantic Fisheries are particularly rich, because the meeting of warm and cold currents stimulates the growth of the tiny plankton which serve as food for the fish, whilst the extensive banks or shallow

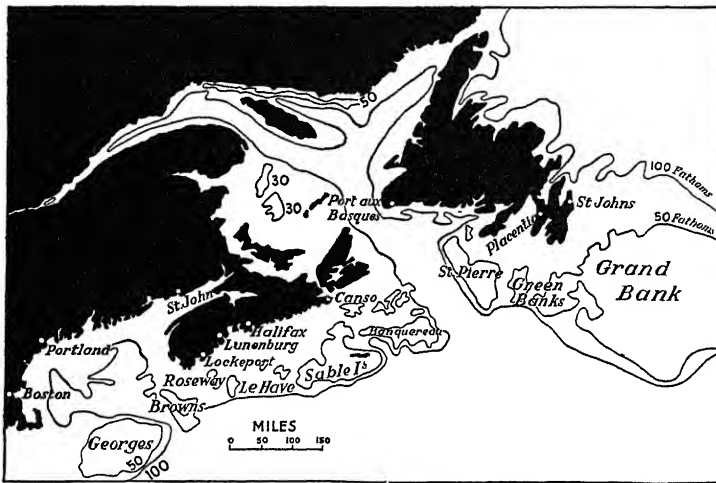


FIG. 15.—The Atlantic fishing grounds of Canada.

areas where the sea is less than 600 feet deep provide ideal breeding grounds. The chief fish are cod, halibut, haddock, hake, herring, and mackerel, whilst nearer inshore are salmon, shad and alewife or gaspereau. There are also sardines (canned along the coast), lobsters on the rocky shores, and, locally, oysters and clams. Fishing has always been one of the main activities of the peoples of the Maritimes and Newfoundland.

The Inland Fisheries include those of the Great Lakes, once teeming with fish, but which were recklessly overfished to provide manure for the soil. Many of the tributaries of the St. Lawrence are still rich in such fish as bass, trout, pickerel, and eel, and are fished commercially. Fishing for sport attracts large numbers of summer

visitors, especially from the United States, to the lakes and streams of both eastern and western Canada.

The Pacific Fisheries include particularly those for salmon near the estuaries of the Skeena, Fraser, Nass, and other rivers—for many years representing by value two-fifths of the total Canadian catch. Here again exhaustion is a serious menace: however, fish hatcheries which breed fish, later released in the sea or river, are doing much to stabilize the annual harvest, whilst research stations study the many problems. Increased attention has been paid to deep-sea or off-shore fish—cod, halibut, and herring—and also to whaling. Much of the fish from the Pacific coast is canned, or put into cold storage (e.g. at Prince Rupert) for despatch later to other parts of the North American Continent.

There are also fisheries in Hudson Bay.

Nearly two-thirds of the total catch is exported—fresh or chilled to the United States, canned to Europe and the U.S.A., salted to the West Indies and Catholic South America.

Agriculture. Although ever-growing proportions of Canadians are town dwellers and the range of manufactures is ever increasing, nearly one-third of all those employed in the country are on farms or are connected with farming. Over three million men, women, and children live on Canada's 600,000 rural properties (not all of them real farms) which have about 60,000,000 acres of crops and 50,000,000 acres of prairie or natural pasture. Even these huge totals mean that crops occupy less than $3\frac{1}{2}$ per cent. of the surface of the country.

There are great contrasts between one part of the country and another, and three main regions may be noted.

Eastern Canada. In the St. Lawrence Lowlands, the Maritime Provinces, and Newfoundland mixed farming is carried on, as it has been since the first settlers from France or Britain reclaimed the land from the forest and tilled it. In Quebec, western New Brunswick, and eastern Ontario the farmers are nearly all French-speaking and the large village churches, often with spires covered with aluminium or aluminium paint which make them stand out in the landscape, are very distinctive, as are the long narrow fields. The soils vary; some are sandy or stony and poor, but there are large stretches of deep fertile silt and loam soils. The rainfall is reliable and the summers warm, so that fodder crops of hay, roots, and oats are the usual ones and most farmers keep dairy cattle. The Maritime Provinces and Newfoundland, largely English-speaking, have similar lowland farming areas, so that the whole is a *Hay and Dairying Region*. There are local specializations—such as potatoes in Prince Edward Island, and apples in the Annapolis–Cornwallis Valley. Near towns the local markets encourage the production of milk, fruit, and vegetables. Small quantities of tobacco are grown in the Montreal Plain and apples on the slopes of hills rising from the plain. In the

English-speaking Ontario peninsula farming becomes more intense, with an emphasis on truck farming and fruit (including peaches and grapes), the latter near the Lake shores where the extremes of heat and cold are moderated. Tobacco and sugar-beet are also noteworthy crops.

The Prairies or Mid-Continent Grasslands have been replaced by vast wheatfields in the *Spring Wheat Region* of Manitoba, Saskatchewan, and Alberta. Mechanization has made great strides in eastern Canada, but is seen to best advantage in the Prairie lands, enabling one man to farm up to two hundred acres or more. But this extensive monoculture, as it is called, exhausts the soil and the average yields are low—only about one-third of those in the intensively farmed areas of western Europe. So the change to mixed farming is gradually taking place, especially near the towns. In addition to

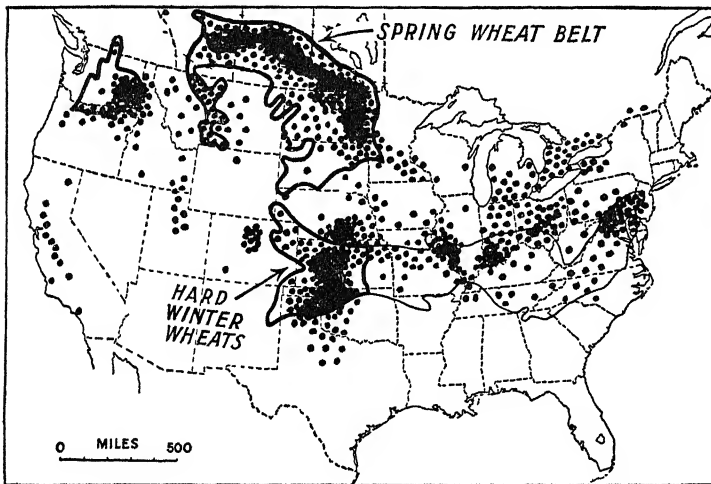


FIG. 16.—The wheatlands of North America.

For the names of the regions marked see Fig. 11

truck and dairy produce, increasing quantities of such crops as flax, sugar-beet, sunflowers, etc., are being grown. With the development of quickly maturing and disease-resisting wheats grain farming has been pushed farther north, notably into the Peace River country. Along the northern margins of the Prairies, in the Grove Belt or Park Belt, there is much mixed farming. Hay crops on which animals can feed will grow in the cooler summers where wheat would not ripen well. In the south-west of the Prairies in southern Alberta and south-western Saskatchewan it is too dry for most field crops, but here irrigation has made it possible to raise a wide range of crops, including wheat, alfalfa, vegetables, and beet. The western margins

of the Prairies in Alberta, corresponding to the High Plains of the United States, are still devoted to ranching.

British Columbia. Here mixed farming and fruit farming are carried on in the valleys and small tracts of coastal lowland. On the damper lowlands of Vancouver Island and the West Coast are found dairying, poultry farming, and truck farming to supply the local urban markets of Vancouver and Victoria. In the dry, sunny, warm valleys, notably the Okanagan Valley, of the southern interior various fruits (including apples and peaches) and vegetables are grown with the aid of irrigation. On the intervening plateaus ranching is carried on.

FIELD CROPS OF CANADA—ACREAGE

	Acreage (in millions)			
	1922-24	1928	1931-35	1953
Fall wheat	0.8	0.8	0.5	0.7
Spring wheat	21.3	23.3	25.0	24.8
Oats	14.5	13.2	13.4	9.8
Barley	2.9	4.9	3.8	8.9
Rye	1.5	0.8	0.7	1.5
Mixed grains	0.8	1.1	1.2	1.4
Potatoes	0.6	0.6	0.6	0.3
Hay and clover	9.9	10.3	8.9	} 10.7
Alfalfa	0.4	0.9	0.7	
Fodder corn	0.7	0.4	0.4	0.4
Total, all crops	57.1	56.2	57.8	60.6

Wheat. Fall, or winter, wheat is an important crop in the mixed-farming belt of the St. Lawrence Lowlands, but nearly all the wheat of the great wheat lands (the Prairie Provinces) is spring wheat—a natural result of the hard winter on the prairies. The three Prairie Provinces of Manitoba, Saskatchewan, and Alberta have over 95 per cent. of the acreage under wheat in Canada, and further details will therefore be given under the Prairie Provinces. In a good year 500,000,000 bushels may be produced, in an average year about 400,000,000. About 100,000,000 bushels are needed for seed and home use. The surplus is available for export. Thus in the crop year ended July 31, 1930, exports totalled 186,000,000 bushels, or 5,000,000 metric tons (including that exported as flour); in the year 1928-29, 408,000,000 bushels, or about 11,000,000 metric tons. This should be compared with the total *production* in 1948 of 393,000,000 bushels and in 1949 372,000,000 bushels so that far less was available for export than in inter-war years, but 1952 and 1953 produced phenomenal crops of over 600,000,000 bushels. As a result there was a huge carry over and acreage in 1954 was reduced. The

Oats. Oats form the leading cereal crop of the cold, damp Maritime Provinces, and in Quebec and Ontario and in the Prairie Provinces occupy an area of about a half of that of wheat. The oat belt lies, on the whole, to the north of the wheat belt, and oats form the most promising crop possible on the agricultural lands still to be developed along the fringes of the northern forests. The bulk of the crop is retained for home consumption; exports, considerable in inter-war years, are sent largely to the United States.

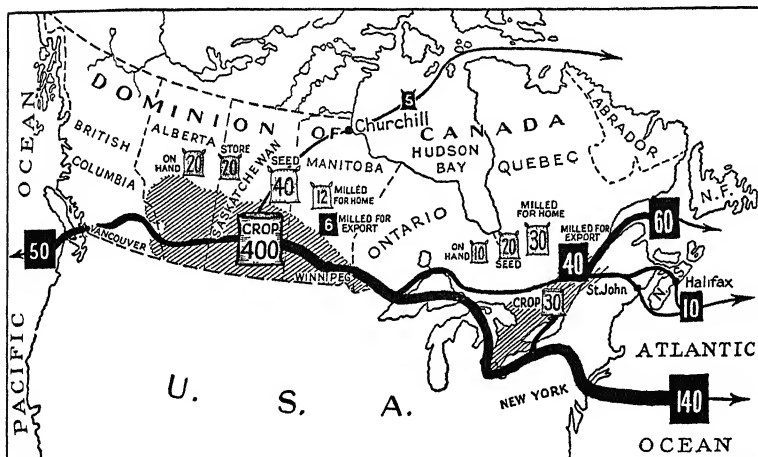


FIG. 17.—Diagram showing how the Canadian wheat crop is distributed.
The figures are in millions of bushels for an average crop.

Rye. Outside of Europe, growing about 96 per cent. of the world's crop, the United States and Canada are the only countries with a considerable rye crop. In the years 1925-29 the Canadian crop averaged over 12,900,000 bushels, over three-quarters of which was autumn rye, though the bulk is grown in the Prairie Provinces, especially Saskatchewan. In 1937 harvest was only 5,800,000 bushels but in 1948 reached 25,000,000 bushels—influenced by immigrants from Eastern Europe.

Mixed Grains. It is interesting to notice that "mixed grains" show a higher yield per acre than any pure cereal crop in Canada—a

yield often more than double the average for wheat. The bulk of the crop is grown in the dairying lands of Ontario and Quebec.

Potatoes. Comparatively unimportant in the Prairie Provinces, potatoes form a heavy crop in the St. Lawrence Lowlands and the Maritime Provinces. Prince Edward Island is especially famous.

Hay and Fodder. Hay and fodder are naturally important in all the dairy-farming regions, and the bulk of the crop is grown in Ontario and Quebec. Except in British Columbia and the Ontario peninsula, severe winters necessitate stall feeding and demand the provision of a large quantity of hay. Much corn and grain are grown as green fodder as well as root crops (turnips, mangolds, etc.).

Alfalfa. Most of the alfalfa is grown in Ontario.

Fruit. The wild fruits of Canada are numerous and varied, and the climatic and soil conditions in many areas are eminently suitable for commercial fruit growing. The small fruits grown for sale are more particularly for local markets, and fruit farming is often a feature of agricultural production in suburban areas. Certain districts are particularly notable as centres of fruit production—the Annapolis valley of Nova Scotia, the Ontario peninsula, and the Okanagan valley of British Columbia are outstanding; the northern shores of Lake Ontario, the Georgian Bay district, the neighbourhood of Montreal, and sheltered positions in south-western British Columbia and Vancouver Island are also important. The bulk of the Nova Scotia apple crop, which formerly approached or even exceeded 6,000,000 bushels, was exported to Great Britain, and the loss of this market almost killed the industry. It has, however, recovered to more than half the old total. In the Ontario peninsula apples are again very important, but a great variety of fruit is grown in the Niagara district, including such denizens of warmer climes as grapes. In British Columbia fruit growing is a later development. The crop of apples reached 5,500,000 bushels in 1934, and though badly affected by war conditions was again over 5,000,000 bushels in 1951.

Other Crops. Maple sugar and maple syrup, characteristic products of Canada of importance in confectionery, are produced mainly in Quebec; sugar-beet is showing an increasing importance in Ontario and Alberta; tobacco is almost restricted to Ontario and Quebec. Flax, hemp, hops, seeds, and bulbs should be noted.

Dairy Farming. Dairying is one of the oldest and is now one of the most important industries of Canada. In the inter-war years Ontario's share was nearly one-half, Quebec's a quarter, with a rapidly increasing production from the Prairie Provinces.

Stock-rearing. As in other countries the number of *horses* in Canada has dropped, due to the increasing use of mechanical power. There has been an increase in the number of *milch cows*, but a marked

decline in the number of *beef cattle*. This marks the change from extensive ranching to more intensive dairying. *Sheep farming* is not outstanding in Canada. The severity of the Prairie winter is unfavourable to sheep farming, and the bulk of the sheep are in the St. Lawrence Lowlands and Maritime Provinces; the total of sheep had dropped from 3,700,000 in 1930 to 2,250,000 in 1948-52. *Pig farming* and the production of bacon is progressing, so that both it and the *poultry-farming* industry have assumed a real importance of recent years, due to the increased home consumption of eggs and the steady demand for table poultry.

Reference has already been made to the dairy-farming industry; beef cattle are most numerous in Alberta and Saskatchewan, which

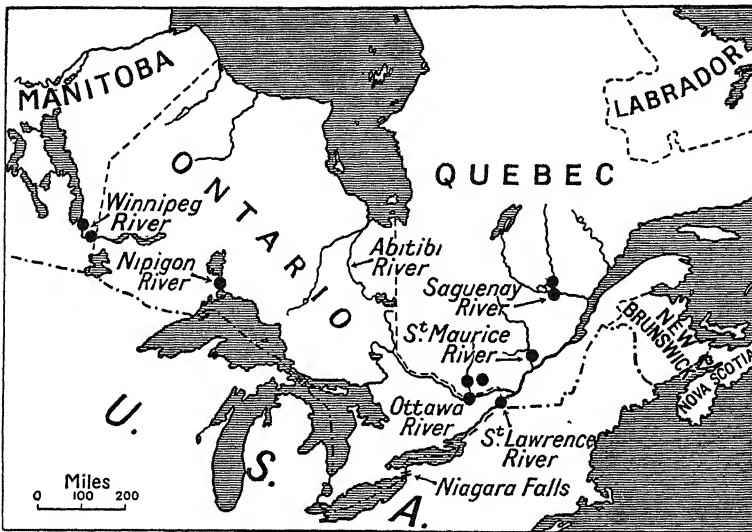


FIG. 18.—Hydro-electric power stations in eastern Canada.

are thus the leading ranching provinces, but the number of beef yearlings is greatest in the mixed-farming area of Ontario. Pigs and poultry are also most numerous in the eastern Provinces, but increasing in importance in the Prairie Provinces.

Water Power. Nearly every village and hamlet in Canada has electricity, and more than three-quarters of all manufacturing machinery is electrically driven. Much of the electricity used is derived from water power. In southern *British Columbia*, owing to the mild winters, the rivers do not freeze but flow throughout the year and there are many power stations. Further north is the great Kitimat scheme where water is brought by tunnel through the mountains. There are several works in the *Prairie Provinces*, and some

really big developments in eastern Canada in *Ontario* and *Quebec*. One very large source of power is the Niagara Falls, located between Lake Erie and Lake Ontario, which is at a lower level. Apart from this it is the rivers draining southwards from the Canadian Shield to the St. Lawrence River which afford the chief power sites. The reasons for this are: (a) the high southern rim of the Shield affords a good fall of water; (b) the lakes on the Shield are natural reservoirs assuring a steady flow; (c) the sites are near the manufacturing towns of the Lowlands and also where much power is needed for saw mills and pulp mills. The map (Fig. 18) shows some of the important sites—notably on the Saguenay (at Shipshaw), St. Maurice (at Shawinigan), Ottawa, and Nipigon Rivers.

Manufactures. Manufacturing industries in Canada made great strides during the First World War when European supplies were cut off. From that time there has been continuous development until to-day Canada produces for export a wide range from paper bags to ocean freighters. Amongst the manufactures we may distinguish:

- (1) Those using home raw materials—including timber-working and plywood manufacture, pulp-milling, paper-making, flour-milling, slaughtering and meat-packing, milk-canning, cheese manufacture, vegetable-canning, metal-smelting and working.
- (2) Those using imported raw materials—including the making of cotton and woollen goods, clothing, rubber goods, motor cars, and iron and steel goods of great variety.

Four-fifths of the factories are found in the Great Lakes—St. Lawrence Lowlands Region. *Montreal* is the biggest centre, followed closely by *Toronto* and then by *Hamilton* and *Windsor*. The industries of Montreal are very varied; Toronto specializes in meat-packing, biscuit-making, electrical equipment, and clothing manufacture. Hamilton is the great iron and steel centre; Windsor, like its great United States neighbour Detroit, produces automobiles. Many other towns share in the varied activities.

The small manufacturing towns of the Maritime Provinces and Newfoundland are a long way down the list—the chief are Halifax (N.S.) and Saint John (N.B.); on the island of Newfoundland Grand Falls and Corner Brook are famous for their pulp mills, whilst St. John's specializes in fish-processing and ship-repairing.

The manufactures of the Prairie towns are based primarily on local raw materials. Winnipeg ranks sixth in value of output amongst Canadian centres: Edmonton and Calgary also have important manufactures.

Vancouver with its neighbour New Westminster has recently been the fastest growing industrial town of Canada and now ranks fourth or fifth. With its mild winter permitting most activities such as

shipbuilding to go on throughout the year, its magnificent port, and its wealth of local raw materials, it has great prospects.

Foreign Trade. As an exporting country Canada ranks third in the world after the United States and Britain and as an importing country is nearly as important. Canada is always likely to remain prominent in the world's international trade for several reasons. She has vast reserves of minerals which other countries need, and she produces them in abundance. Her forests, if properly managed, can supply many importing countries' needs of pulp, paper, lumber,

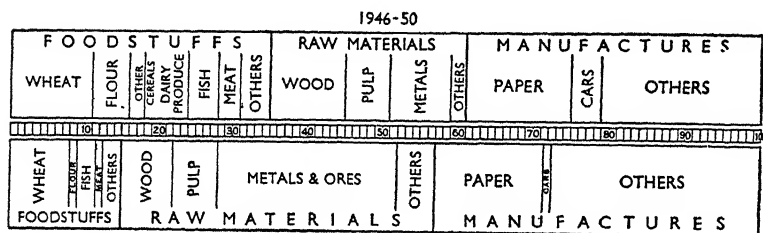


FIG. 19.—The exports of Canada.
Shown as a percentage of total exports by value.

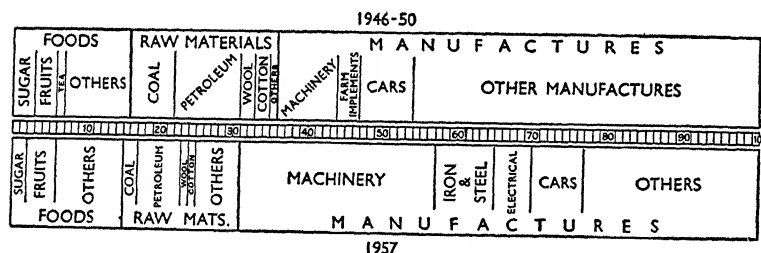


FIG. 20.—The imports of Canada.

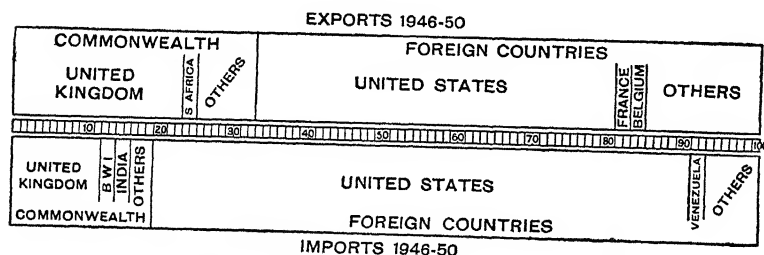


FIG. 21.—The direction of Canadian foreign trade.

and plywood for many decades to come; of her agricultural output there is also a vast surplus. Indeed, Canada exports between a quarter and a third of her total production in all fields. Yet Canada lies entirely in the northern parts of mid-latitudes and will always need to import commodities of tropical and equatorial origin.

Sixty per cent. of Canada's exports are of raw materials and food-stuffs, the remainder—a growing amount—of manufactures. If we examine the *exports* of Canada and the *imports* of Britain we see how very many of Britain's needs Canada can supply. Although the United States and Britain are Canada's chief customers, she exports to almost the whole world.

The United States is so close to Canada that naturally the bulk of imports of manufactured goods comes from that country.

The Peopling of Canada. It is almost certain that European Norsemen—from Norway and Iceland—knew the coasts of Labrador and fished off Newfoundland long before Columbus “discovered” America. In the rediscovery of the New World John Cabot in 1497 was probably the first man to land on what is now Canadian territory. There followed a long period of exploration by traders and missionaries, but the first permanent European settlement at Port Royal near Annapolis in Nova Scotia was not established till 1605. Shortly afterwards Quebec was established (1608) and Montreal in 1642. These were French settlements, but their progress was slow—by 1666 there were only 3,250 settlers in Canada. When the French crown took over administration from the French chartered companies there was a renewed interest and by 1763 when the Colony fell to the British there were 65,000 people. Fur traders by that time had established trading stations far afield—beyond Winnipeg and on the Saskatchewan River. After the British conquest there was a rush of English-speaking people to the towns as merchants and administrators; those British who settled in the country often became French-speaking and were absorbed into the French population. In 1775–76 when the United States became independent some 40,000 “United Empire Loyalists” settled in Canada and were rewarded with grants of land. Many others were also attracted by the prospect of free land. Although for some time Britain was inclined to look upon Canada, especially Newfoundland and the Maritime Provinces, as little more than a training ground for seamen, this attitude changed after the Napoleonic Wars (1815) and settlement on the land was encouraged throughout the remainder of the century. In 1867 the provinces of Upper Canada (Ontario), Lower Canada (Quebec), Nova Scotia, and New Brunswick were united to form a single country, and so Canada became a nation, other provinces joining later. In the eighties the building of railways made possible the real opening-up of the Prairies, and in 1886 British Columbia was linked with the east by the completion of the Canadian Pacific Railway. Previous to that time there had been grave doubts whether British Columbia would remain with Canada or join the United States. British Columbia actually joined Canada in 1871.

At the census of 1901 the 5,100,000 people of Canada were 57 per cent. of British descent, 31 per cent. of French descent, 10 per cent.

other Europeans, and 2 per cent. American Indians. Since there had been practically no immigration from France, the French-Canadians were all descendants of original settlers. In that same year 88 per cent. of the people lived in the east; only 8 per cent. in the Prairies and 4 per cent. in the west.

Then followed, from 1900 to 1914, a period of mass immigration. Of the 3 million people who swarmed in about 38 per cent. came from the British Isles, 35 per cent. from the United States, but no less than 27 per cent. from Continental Europe—Scandinavians, Poles, Russians, Germans, Italians, and others. This meant a great change and was continued on a smaller scale after the First World War.

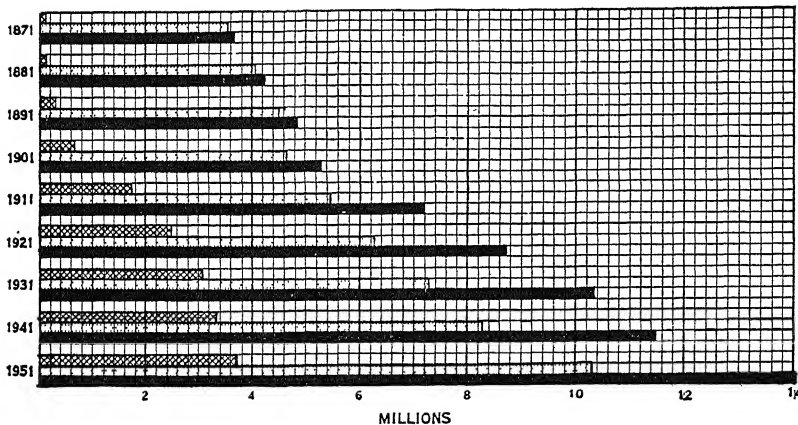


FIG. 22.—The growth of Canada's population.

The solid black line shows the *total* population. The upper line is the population of the Prairies and the West, the middle line the population of eastern Canada. Notice the rapid development of the Prairies and West until 1931. Since then increase in the Prairies has slowed down, but in 1941 to 1951 British Columbia showed a 42.5 per cent. increase.

Distribution of Population. It has been estimated that from 10 to 20 per cent. of the surface of Canada can be permanently populated. At present the vast majority of the people live within 150 miles, or at the most 200 miles, from the 3,000-mile long southern border. Even there, owing to unfavourable physical conditions, notably in the Shield country north of the Great Lakes, settlement is not continuous. The population is concentrated:

- (1) In Newfoundland and the Maritime Provinces—along the coasts and in the valleys (11 per cent. of total in 1951).
- (2) In the southern lowlands of the Provinces of Quebec and Ontario (63 per cent.).
- (3) In the Prairies (18 per cent.).
- (4) In the valleys and coastlands of British Columbia (8 per cent.).

Most of these populous zones are nearer to an inhabited part of the United States than they are to one another, with the result that there is much movement from north to south.

Rather over 30 per cent. of Canadians are French-speaking. American-Indians number only a little over 100,000, Eskimos a few thousand, and Asiatics under 100,000. This means that the population was almost entirely of European stock—half from the British Isles, half from Continental Europe. The French Canadians are nearly all descended from early settlers; recent immigrants have been Germans, Ukrainians, Scandinavians, Dutch, Poles, Italians, and Russians.



FIG. 23 —The Great Lakes

The black dots are the main sources of iron ore. Arrows show chief commodities sent to the lakes for transport, to these should be added timber from many parts of the Shield, and iron ore from Steep Rock north-west of Fort William. By far the greater part of the enormous cargo passing through the Soo Canals is iron ore

French-Canadians have spread beyond the confines of their native Quebec, but comparatively few are found west of Winnipeg, though there are some colonies in the Prairies. Whilst many recent immigrants from Continental Europe may remain in the east, large numbers go both to the rural districts and towns of the Prairies and become absorbed in the Canadian population. British Columbia remains the most "English" part of Canada.

Transportation and Communications. In a country 3,500 miles across, with some vast stretches such as the Shield country north of the Great Lakes almost incapable of supporting any population, the railway has played an enormously important part in making settlement possible, in keeping the country united, and in developing trade. The pioneer was the Canadian Pacific Railway, which sought out the obvious routes through the richer parts of the Prairies. It

developed steamship routes on both Atlantic and Pacific, later air routes, became a great landowner and played a large part in the actual development of the land. It owns and runs the largest hotel in the British Commonwealth—one of a string of hotels across the country—as well as many tourist resorts. The railways which came later had less favourable routes: of the Grand Trunk Pacific it was said, “It started from nowhere (actually from Moncton, a town of 23,000 people in New Brunswick), went to nowhere (Prince Rupert, B.C., with a population of 8,000), and passed through no towns en route.” These later railways did not pay and were eventually taken over by the Government and formed into the Canadian National Railways, since when unified ownership and working have done much to change their fortunes.

The railway network has been developed over all the more fertile and populous areas. Few settlements are more than 20 miles from a railway; indeed, few Canadians live more than ten miles from a station. Many of the lines are used mainly, or even exclusively, for freight owing to the widespread use of motor cars for short or medium journeys and long-distance buses (at low fares) for longer. Compared with the half-dozen lines across the Rockies in the United States, Canada with four trans-Continental lines is well served. The southern line of the C.P.R. uses the Crow’s Nest Pass route and links the mineral-producing and fruit-growing areas of southern British Columbia with the Pacific coast. Its main line uses the famous Kicking Horse Pass, whilst the C.N.R. uses the Yellowhead Pass, with two lines branching, one to Vancouver and the other to Prince Rupert. Note how the trunk lines all converge on Winnipeg and the reasons for this.

Enormously important to Canada are the Great Lakes, though navigation is closed by ice in the winter months (late December to mid-April). The long-planned St. Lawrence Seaway which Canada finally in 1951 decided to undertake on her own responsibility now permits large ocean vessels to go straight to Fort William or Port Arthur for their grain cargoes. Small vessels could previously do this. The Welland canal between Lakes Erie and Ontario already allowed vessels of 27 feet draught. The United States eventually decided to join Canada on the Seaway project finished in 1959.

Canada has gone ahead with surfacing roads, but with a far smaller population has a greater problem than the United States.

Air services make a daylight flight from Montreal to Vancouver a daily commonplace, but even more important is the ready access they promote to once remote northern areas.

Ports. On the east Canada’s great port is Montreal, accessible to large ocean liners. They could not proceed farther because of the Lachine Rapids: only small vessels drawing less than 14 feet could use the old canals. Unfortunately Montreal is closed by ice in the winter

and Quebec, lower down the St. Lawrence, does not remain open much longer. So Canada's main winter port is Halifax, open throughout the year and much nearer to Europe. Halifax, however, is a thousand miles from the populous manufacturing areas of Ontario and Quebec and the same is true of the other ports of the Maritimes—Saint John and Sydney.

Actually all Canadian ports are a long way from the great grain-producing lands of the Prairies and the most important port shipping Canadian grain to Europe is generally New York. The grain travels *via* Fort William—Port Arthur and the Great Lakes to Buffalo, then by canal or rail to New York. It is an obvious loss to Canada to pay freight through the United States and so Churchill on Hudson Bay was equipped as a port, and a railway constructed direct from the Prairies. But Churchill is only accessible for about ten weeks when the mouth of Hudson Bay is free of ice and has been only a moderate success. Much Prairies grain is sent over the Rockies to Vancouver. In addition Vancouver handles the exports of British Columbia, and in point of tonnage of vessels entered and cleared can claim in many years to be Canada's chief port. It shares some of its trade with New Westminster, Victoria, and Nanaimo. Prince Rupert, farther north, has not developed to the extent hoped, though equipped to handle much grain.

THE GEOGRAPHICAL REGIONS OF CANADA

The Canadian Appalachians. Since the Appalachian Mountain system of the eastern United States extends through New England without interruption into the Maritime Provinces of Canada and the adjacent parts of the Province of Quebec, and to Newfoundland, the term "Canadian Appalachians" is a convenient one to describe the whole.

The Maritime Provinces. This name is given to the three small English-speaking provinces of eastern Canada—Nova Scotia, Prince Edward Island, and New Brunswick, which have an area of a little over 50,000 square miles (*cf.* England) and a population of a little over a million. Large areas, such as the heart of New Brunswick which adjoins similar country in Maine, remain wooded and sparsely populated, but there are three areas less rugged and more closely settled than the remainder. These three areas, consisting of Carboniferous and Triassic rocks, are the long, narrow Annapolis and Cornwallis valleys of Nova Scotia, Prince Edward Island, and the northern part of New Brunswick. Helped by the climate they provide the principal agricultural lands. With a moderate rainfall of between 30 and 50 inches well distributed through the year, a cold winter which helps to kill off insect pests, and a warm summer—especially sunny in the latter part—the conditions favour the ripening of fruit

This fact helps to explain why Nova Scotia was able to develop an important apple industry.

Prince Edward Island, the "Garden of the Gulf," has fine red fertile soils and is famed for potatoes, fruits, and cereals and has also important dairying and breeding interests. Its fox-fur farms are not as important as formerly, but its coastal fisheries continue to give employment to many families.

The Maritimes have coalfields of good-quality coal, but the principal workings are near Sydney, on Cape Breton Island (Nova Scotia). This field is well situated for supplying coal to Quebec, Montreal, and other St. Lawrence ports during the open navigation season. Mining is continued during the winter and great stocks of coal await the opening of the Gulf in spring. A large proportion of the coal output, however, is used in the manufacture of iron and steel from the iron ore of Bell Isle, Newfoundland. Cargoes of coal are also sent southwards to the New England States.

The Maritime Provinces have the two great winter ports of Canada—Halifax and Saint John—both with deep-water harbours open throughout the year and nearer to Liverpool than any of the United States ports or St. Lawrence ports. They are connected with the Canadian railway network both by direct lines passing through United States territory and by longer routes entirely in Canada.

The coastlands have many attractive holiday resorts, but parts suffer from treacherous tides—the Bay of Fundy has the highest tides in the world.

Gaspé. This rugged peninsula has some fine cliff scenery with small French-Canadian fishing settlements located where there is a little shelter. A coast road has thrown it open to tourists and it is visited annually by thousands of Americans.

The Rive Sud or South Shore of the St. Lawrence Estuary from opposite Quebec town to Gaspé is a narrow strip of French Canada consisting of a settled lowland farming belt forming an almost continuous ribbon along the coast with a rugged, rather barren highland behind.

The Eastern Townships of the Province of Quebec form a natural continuation of the New England States of New Hampshire and Vermont. The rolling landscape is pleasantly wooded and dotted with farms, now occupied mainly by French-Canadians and devoted to mixed farming, with an emphasis on hay and dairying. There are numerous lakes and a large transient population occupying lake-side cottages or converted farmhouses. There are several small towns with local industries, such as textiles (*e.g.* at Sherbrooke; see Fig. 24). The towns are often located where small waterfalls were a source of power to the early settlers. In this area, at Thetford and Black Lake, are the large open asbestos mines producing a major proportion of the world's total.

Newfoundland. Structurally, Newfoundland is a detached portion of the Canadian Appalachian Region. The west is dominated by the 300-mile long Long Range Mountains, many parts of which are over 2,000 feet high; in the south-west are the Southern Long Range Mountains. Much of the remainder of the island is over 500 feet above sea-level and the whole is best described as a rolling plateau. During the Great Ice Age the island was completely covered by ice, which swept away most of the pre-existing soil and loose rock. As a result large areas are almost bare of soil, but innumerable lakes occupy glacial hollows.

In spite of its insular nature Newfoundland has a cold climate; the cold Labrador current with numerous icebergs chills the air above it, and warm air masses from the south penetrate but rarely. The winters are thus long and cold (January 9° F. at Belle Isle to 23° F. at St. John's) and the summers cool with only short warm spells. Only the favoured Corner Brook district on the west coast has a mean July temperature much exceeding 60° F. Precipitation is abundant and well distributed through the year, so that there is much snow in winter—near the north-east coast exceeding 10 feet. The coasts—except a strip along the south—ice up in winter with a maximum extent in March.

Newfoundland lies in the belt of the northern coniferous forests, but about half the island is covered with moss and bog. The best forests are on the well-drained valley slopes, with balsam fir, black spruce, white spruce, and white pine. These species are the main source of pulpwood for the great mills at Grand Falls and Corner Brook using local hydro-electric power. The pulp industry has killed the export of lumber; indeed lumber is imported.

Fishing occupies many more people than the forests—especially for cod on the Grand Bank and inshore fisheries round the coasts. There is a large export of dried salted cod. In recent years there has been a revival of whaling and sealing.

Various minerals occur, but by far the most important mining industry is for the rich red haematite of Bell Island in Conception Bay—the bulk going to Sydney, Nova Scotia, for smelting.

Agriculture plays a minor part in the life of the country. The farms are mainly small-holdings producing hay and potatoes and keeping a few dairy cattle and sheep.

Conditions are not suitable for close settlement and in the area of 42,000 square miles only about 360,000 people live—mainly in coastal settlements and especially in and near St. John's, the capital, which has 52,000 people. A railway runs across the island and connects the main settlements, but there is no road right across. Since Newfoundland is less than 2,000 miles from Ireland and lies practically on the great circle route from Montreal and New York to western Europe, the airport at Gander has become well known on

the trans-Atlantic route and the "hop" commonly used by several lines is Gander to Shannon (Irish Republic).

For long Newfoundland was a separate dominion of the British Commonwealth, but with only a very small population found it difficult to carry on alone. So on April 1, 1949, Newfoundland (and with it 112,630 square miles of Labrador) became Canada's tenth province.

The Canadian Shield. This enormous area, between a third and a half of all Canada, consists essentially of a great mass of extremely ancient rocks much folded and faulted in the early days of the earth's geological history. Whilst they are very hard and resistant to weathering (hence the term "shield"), over huge areas these rocks have been worn down to monotonous, almost level surfaces. In many books the whole Canadian Shield is called the Laurentian Shield, but Canadians when they talk about the "Laurentians" mean merely the mountainous rim of the Shield which lies north of Ottawa and Montreal.

Although vast areas are very monotonous, the character and surface of the Shield vary greatly from one part to another.

West of Hudson Bay there are large stretches where the ancient rocks, swept bare of soil by the great ice sheets of the Ice Age, give rise to a surface with innumerable irregular lakes draining sluggishly to Hudson Bay. The tundra, or barren lands, give place southwards to forest, at first with stunted spruce, but gradually with larger trees. In the early days of the development of Canada the Hudson's Bay Company traded largely in furs obtained from the animals of these northern forests. There is a sparse population of Indians—who live in the country *south* of the Eskimo and only in one or two places are Eskimo and Indians found together.

East of Hudson Bay, in northern Quebec and Labrador, the Shield has some varied country. It overlooks the St. Lawrence valley by a high complex scarp—the Laurentian Scarp—with elevations of up to 3,000 feet and more. Rivers such as the Saguenay and St. Maurice cut through this scarp in deep valleys which are often rift valleys and this southern part has been industrially developed on a very big scale because of the hydro-electric power from the streams and the wealth of the forests in pulpwood. Northwards lies a lake-studded plateau with occasional hills (monadnocks) rising from the surface. To the west, glacial silts and clays have given rise to the now well-known "Clay Belt" of northern Ontario and Quebec and to the marine silts or clays of the lowlands round James Bay. The Clay Belt, served by a line of the C.N.R., has good deep soils, and farming (with an emphasis on pasture, fodder crops, and dairying) is possible. Otherwise the country is forested, mainly with black spruce, until the northern limit of forest is reached. However, each year sees more and more of this forest cut down to supply the ever-growing demands

of the saw mills and pulp mills. In the Ungava district of northern Quebec and neighbouring parts of Labrador rich iron ore deposits have been discovered and in 1954 the first outward shipment of ore was made by a new railway running inland from the north shore of the St. Lawrence. Other great mineral discoveries in the Shield include uranium ores near Great Bear Lake and at Blind River near Lake Superior, iron ore near Lake Superior, and gold at Yellowknife. The older mineral areas lie towards the south—especially Sudbury (nickel and copper) and Cobalt (silver and cobalt), with goldfields at Porcupine, Kirkland Lake, and Noranda producing four-fifths of Canada's gold.

The southern part of the Shield, apart from its minerals and forests, has almost inexhaustible water-power resources. In addition it provides, with its many beautiful lakes, a much frequented holiday playground, especially in the Muskoka Lake area and the Laurentians north of Montreal. These areas are well served by railways and motor roads. Most islands in Georgian Bay have summer cottages and attract visitors, especially from Toronto.

On the north-western shores of Lake Superior stand the twin cities of Fort William and Port Arthur. Though they thus stand on the ancient rocks of the Shield, their function is as outlets for the prairie wheatlands. In the same way Churchill, on Hudson Bay, was planned and built as an outlet to the Prairies.

The Canadian Arctic Archipelago. To the north of Canada are the numerous islands, some mountainous, some low-lying, which lie in the Arctic Ocean. There are some lonely weather stations, scattered R.C.M.P. posts, and Hudson's Bay Company's stores, now readily accessible by air, but otherwise a few Eskimo are the only inhabitants.

The St. Lawrence Lowlands. The extensive lowlands which border Lake Erie and Lake Ontario on the north are cut off from the narrower belt of lowlands which border the St. Lawrence by a spur from the Canadian Shield, brought to the surface by the Frontenac axis, which crosses the St. Lawrence below its exit from Lake Ontario and swells out on the United States side to form the Adirondacks. Lake Ontario is 245 feet above sea-level and in its 180-mile course to Montreal the river passes through many rapids. Thus Montreal was the effective head of ocean navigation, though the Lachine and other canals gave access to the Great Lakes for small ocean-going vessels. The St. Lawrence Lowlands may be described therefore as the lowlands on either side of the St. Lawrence which lie east of the Frontenac axis.

The *Ottawa Region* is farming country of moderate quality. Ottawa, political centre of the whole of Canada, was selected by Queen Victoria to be the capital because of the jealousy between the rival claimants to the honour. It remains much smaller than Montreal or Toronto, though, together with Hull on the opposite northern

bank of the Ottawa River, it has become an important manufacturing centre with very large saw mills, pulp and paper mills. Just above the city are the Chaudière Falls, which have long been used as a source of industrial power. Ottawa had 202,000 people in 1951.

The *Montreal Plain* stretches from the Laurentian scarp southwards to the United States border. Beyond it is continued by the Lake Champlain lowlands to connect with the Hudson Valley. Much of it is flooded by lake silts and fine alluvium and is very

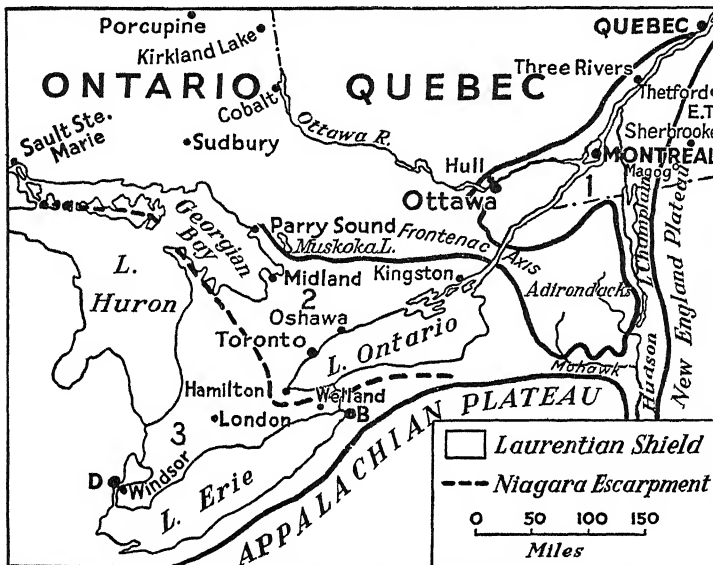


FIG. 24.—The St. Lawrence Lowlands (1) and Lake Peninsula (2 and 3).

The upper, heavy black line marks the southern limit of the Shield.

D=Detroit; B=Buffalo, E.T.=Eastern Townships.

fertile. Where remnants of the formerly much larger Champlain Sea persisted there are peat bogs and some of these when drained give excellent truck farming land, growing vegetables such as lettuces and tomatoes for the Montreal market. On the slopes of isolated hills, formerly islands, which rise from the surface, apple orchards are found. In parts of the plain on some of the warmer, lighter soils some tobacco is grown.

Montreal itself stands on a large island on the northern side of the St. Lawrence River. Docks front the river and immediately behind the old city rises the rocky ridge of Mont Real or Mount Royal—the crest of which now forms a public park. The city, now with many more than a million people, has spread its suburbs all round the

mountain, whilst the magnificent Jacques Cartier road bridge is only one of several crossing the main stream of the river. The port of Montreal, for so long the effective head of ocean navigation, can be reached, except in the five months of the year when the river is blocked by ice, by large liners, but immediately above the port are the Lachine Rapids.

Montreal is not only the largest city¹ and the commercial capital of Canada but also its largest manufacturing city and greatest port. A meeting-place of land and water routes, it is the headquarters of the Canadian Pacific and Canadian National Railways and manufactures much of their rolling stock. It also has large shipbuilding, engineering, and aircraft plants and, like most other large cities, it has clothing, boot and shoe, and food factories. Three-quarters of the people are French-speaking; in addition to the French Université de Montreal at present the seat of McGill University.

The *Three Rivers Plain* is the section of the St. Lawrence Valley half-way between Montreal and Quebec. Trois Rivières or Three Rivers with its large pulp and paper mills is typical of other towns of the north bank using power from the Laurentian streams. The surrounding countryside is carefully farmed by the French-speaking *habitants* whose "long-lot" farms specialize in dairy produce, fruit, and vegetables for the urban markets.

The *Quebec Region* is the lowest part of the plain proper—below Quebec there is only a narrow ledge at the foot of the Laurentian scarp on the north and a slightly wider platform to the south.

Quebec is situated in a commanding position on a rocky peninsula jutting out from the north bank of the St. Lawrence. The old town with the modern docks lies near the river level, but the town has climbed up the steep slopes and along the ridge. Where General Wolfe and his men scaled the "Heights of Abraham" is still the old fort, but the great Hotel Frontenac has an even more commanding position. The lowest bridge over the St. Lawrence—carrying both road and railway—is just above Quebec. Quebec, with its south shore satellite of Levis opposite, has a variety of manufactures including boots and shoes, leather, tobacco, and textiles. With its narrow winding streets and quaint old buildings, this French-speaking city attracts very large numbers of tourists, especially from the United States.

The Lake Peninsula. This name is given to the parts of southern Ontario lying south of the Laurentian scarp and forming a peninsula between Lake Huron on the west and Lakes Erie and Ontario on the south-east. It is underlain by sheets of sedimentary rock which include the famous Niagara Limestone. Where this limestone crops out at the surface it gives rise to a scarp which practically divides the region into two parts. The waters escaping from Lake Erie into

¹ Population, 1,021,500 in 1951.

the Niagara River pass over this scarp in the world-famous Niagara Falls (partly in Canada, partly in the United States) and continue through the Niagara Gorge into Lake Ontario. The water level in Lake Erie is 572 feet above sea-level, in Lake Ontario only 245. The Welland Canal permits vessels to pass from the one to the other. This canal has been reconstructed several times and could take vessels of ocean-going size up to 27 feet draught and so was all ready to serve as part of the St. Lawrence–Great Lakes Seaway.

Over the sedimentary rocks of the Lake Peninsula varied glacial deposits were strewn and, speaking generally, they afford fertile deep soils. Because of their size, the Great Lakes exert a considerable moderating influence on the climate of the neighbouring areas. They temper the summer heat and the winter cold, they retard the coming of spring, thus reducing the hazard of late frost to growing plants. These factors have helped to make this the most productive mixed farming area in the whole of Canada. London on the Thames stands in the heart of the farmlands and has fruit and vegetable canneries. Along the western shores of Lake Ontario and northern shores of Lake Erie is the “Niagara Fruit Belt” where grapes, peaches, and apricots grow. Elsewhere in the Peninsula are apple, cherry, and plum orchards and much tobacco is grown. Because of the nearness of large urban markets, such as Toronto, Hamilton, Buffalo, and Detroit, many farms specialize in truck farming and in the production of milk, butter, eggs, and cheese.

The larger towns have a waterside location where they enjoy easy receipt of such commodities as iron ore and coal from the United States shores of the Great Lakes and are well situated to export their products by both land and water. They use hydro-electric power generated at Niagara Falls. *Toronto* (676,000 in 1951) is second only to Montreal as a manufacturing centre; its highly varied industries include food-processing, electrical gear, machinery, clothing, and paper factories. It has a natural harbour, protected from the open lake waters by an extensive sand spit used as a playground by the citizens of Toronto. Toronto shares some of its industries with Oshawa farther east on the lake shore, which also makes automobiles. Hamilton, Canada's largest iron and steel town, is located at the western end of Lake Ontario, whilst Windsor shares the automobile industry with its great United States neighbour Detroit.

The Prairies. Lying between the great Canadian Shield on the north-east and the Rocky Mountains on the west are found vast plains. The eastern part forms a continuation of the interior lowlands of the United States, the western part a continuation of the High Plains. The whole is underlain by beds of rock, of different ages but younger towards the west, which are alike in being but very little folded. These almost horizontal sediments are usually covered by glacial drift deposits.

By far the most important part of these Canadian plains is the large triangular area, formerly grass-covered, which constitutes the Prairies. Northwards the grasslands pass through the Grove Belt, or Park Belt, of scattered trees before merging into the great northern forests. Settlement has taken place over the Prairies and most of the Grove Belt, but there are only scattered trading posts or mining camps farther north. Thus nearly all the people of the three Prairie Provinces—Manitoba, Saskatchewan, and Alberta—live in the southern parts of each, within 150 miles or so of the United States border.

In the Prairies it is usual to distinguish three levels, sometimes called the three Prairie Steps.

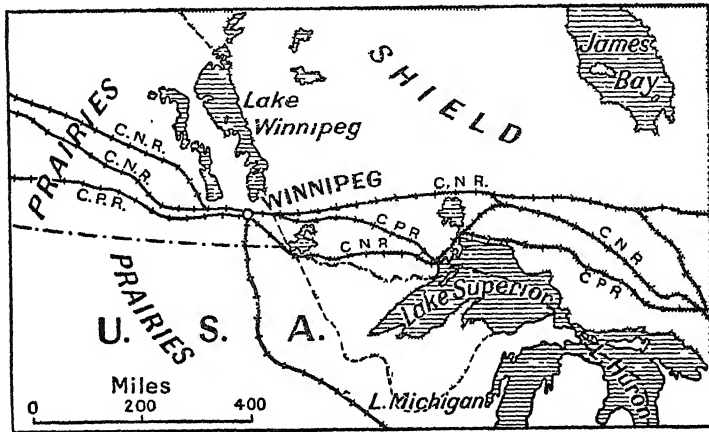


FIG. 25.—The position of Winnipeg—gateway to the Prairies.

(a) The *first level* is the fertile plain lying south and west of Winnipeg. It was once the bed of a glacial lake (Lake Agassiz) and has deep silt soils often so rich in organic matter as to be almost black. In the south it is drained by the Red River. Its famous wheatlands are being occupied more and more by mixed farms.

(b) The *second level* lies mainly in western Manitoba and Saskatchewan. The land is gently rolling and lends itself to ploughing on a large scale, whilst later in the year giant combines cut and thresh the grain from its almost endless fields of wheat and other cereals. Wheat is still the main cash crop, but farmers are being encouraged to introduce new crops and farm on a rotation system and to rely more on animal husbandry.

(c) The *third level* is a continuation of the High Plains of the United States—rolling plains across which the few but large rivers flow eastwards from the Rockies in deep valleys. The south-west is too dry to support arable farming, but some of the valley floors

which have been irrigated, notably those around Lethbridge, are now growing high-yielding crops of wheat, sugar-beet, and alfalfa. The irrigation of large areas is difficult because the rivers flow below the level of the surrounding plains. As a result some of the very driest parts are sandy wastes. Farther north, however, notably west and north of Calgary, are large ranches famed for horses and cattle. This section benefits from the warm chinook winds of winter.

Mention has already been made of the vast coal reserves underlying the Prairies and of the recent discoveries of oil. The Turner Valley field lying south of Calgary has been worked for some time but the great discoveries and developments of the forties and fifties,

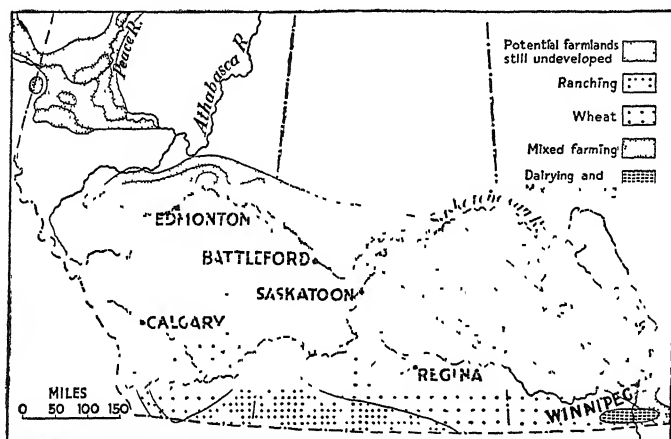


FIG. 26.—Types of farming in the Prairies.

the Leduc, Redwater, and Pembina fields, have been farther north in Alberta, focusing on the rapidly growing provincial capital and university town of Edmonton. There are other fields—some over the provincial border in Saskatchewan.

Over the whole of the Prairies the winters are cold and the summers are warm or hot. Wheat can be grown (except in the south-west, where it is too dry) wherever the temperature is 57° F. or more for at least three months of the year, and agriculture generally is possible wherever the growing season is more than 110 days (Fig. 27). In this area nearly as much oats is produced as wheat, as well as enormous quantities of barley and, on the poorer soils, rye. The oats and barley are often grown towards the north, in regions a little too cold for wheat. Another crop is flax, whilst large quantities of green fodder are grown for feeding cattle. Large numbers of eggs are produced, as well as butter. There are large numbers, too, of pigs. The Prairies of Canada have been developed with great rapidity. In 1900 the area under crops was only one-tenth of what

it is now; the population less than one-fifth; there was not a single town with 50,000 people. This marvellous development was made possible by the railways—roads played a part later. The rivers of the Prairies flow either towards the cold north or into Lake Winnipeg and so through Nelson River into Hudson Bay. The entrance to Hudson Bay is blocked by ice for about nine months of the year. So nearly all the grain has to be sent to the great ports by railway. The grain is taken to the railway by truck or lorries, and stored in grain elevators. The grain is then shot into railroad freight cars (boxcars), and when these reach the seaports the grain can either be stored in the elevators or discharged straight into the steamer. Grain can be treated almost as a liquid—it can be poured through

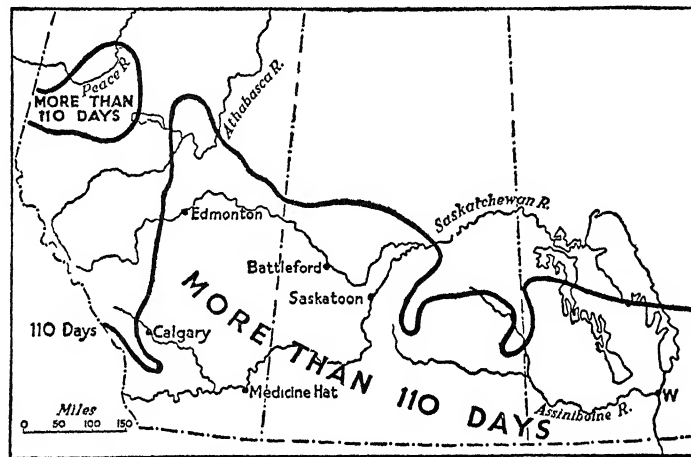


FIG. 27.—The growing season in the Prairies.

W = Winnipeg.

pipes and also sucked up through pipes. There is no need to use bags at all. The towns of the Prairies are grain-collecting centres: *Calgary* (the ranching centre), *Edmonton* (now Alberta's oilfield centre), *Regina*, and *Saskatoon*. They have all grown into towns since 1900. The largest city of all, *Winnipeg*, has roughly a quarter of a million people; in 1881 it had less than 1,000. In addition to their importance as collecting centres, the prairie towns are rapidly becoming industrial centres. Naturally flour-milling is important.

The Peace River District. In summer the warm moist air masses from the Gulf of Mexico penetrate far to the north where there are no mountain barriers and so bring a surprisingly warm July even to the shores of the Arctic Ocean. One area to benefit from this short but warm summer lies on the borders of Alberta and British Columbia—an area drained by the Peace River. The area around Grand

Prairie and Dawson Creek has become a pioneer farming country of mixed farms, with a concentration on wheat, hay, legume seed, and dairy produce. It is reached by rail and road from Edmonton.

The Arctic Lowlands and Mackenzie Delta. Traced northwards the plains between the Canadian Shield and the Rocky Mountains become gradually narrower and end at the Arctic Ocean in the Mackenzie Delta. It is probable that the great oilfield belt extends into this country and a small field has been worked at Norman Wells (N.W.T.) for some years. Along the Athabasca River is located one of the largest tar-sand deposits in the world. In and near the Mackenzie Delta are Eskimo settlements; farther south a few Indians are almost the only permanent inhabitants. The Mackenzie is a useful highway, although it is only free from ice for about four months. For the rest of the year air transport is much used, even for bulky freight.

The Western Cordillera. The Rocky Mountains east of the continental divide lie in the Province of Alberta so that this province includes such famous mountain resorts as Banff and Jasper. Otherwise the western mountain country of Canada lies in, and coincides with, the Province of British Columbia and the Yukon Territory to the north. The whole falls naturally into a number of strips parallel to the Pacific Coast.

(a) *Vancouver Island and Queen Charlotte Islands.* These islands have a mountainous core, a deeply fiorded Pacific coast exposed to storms and heavy rainfall, and a warm, sheltered sunny side with some stretches of fairly flat land on the east. Vancouver Island has valuable forests, especially of Douglas fir, with mills at Alberni. The chief town and port is *Victoria*, the provincial capital, particularly famous for its sunny climate which attracts many retired people. Victoria commands the sea routes to both Seattle and Vancouver. Nearby is the naval harbour of Esquimalt. The small town of *Nanaimo*, where coal has been worked for more than a century, is now more important as the island's centre of road communications.

(b) The depression of the *Strait of Georgia*, a continuation of the Puget Sound depression, is occupied by an island-dotted arm of the Pacific. The important Fraser River empties into the Strait and just to the north, on the shores of Burrard Inlet, stands *Vancouver*. Vancouver has grown very rapidly to become a city of skyscrapers with over 340,000 people in 1951. A spectacular suspension bridge—the longest in the British Commonwealth—spans the narrow but deep entrance to Burrard Inlet and has enabled the suburbs of North and West Vancouver to spread on to the mountain slopes to the north. Vancouver has a large share in the lumber, pulpwood, and plywood trade of the coast and its fishing industry, and also commands the rail route from the southern British Columbian valleys with their fruit and minerals as well as the rail routes

down the Fraser from the Prairies. A direct oil pipe-line from the prairie fields was completed to Burrard Inlet (Vancouver) in 1953. Being entirely ice free Vancouver can handle the export of prairie grain throughout the year. Further the mild winters enable outdoor work to be carried on throughout the year. To the south Vancouver is linked with New Westminster on the banks of the Fraser and which is only a few miles from the United States border. It can be reached by ocean-going vessels and specializes in timber processing.

(c) The *Coast Mountains* are a continuation of the Cascades of the north-western States and form a magnificent rampart of snow-capped mountains running for hundreds of miles parallel to the coast. They are penetrated by deep fiords and the seaward slopes

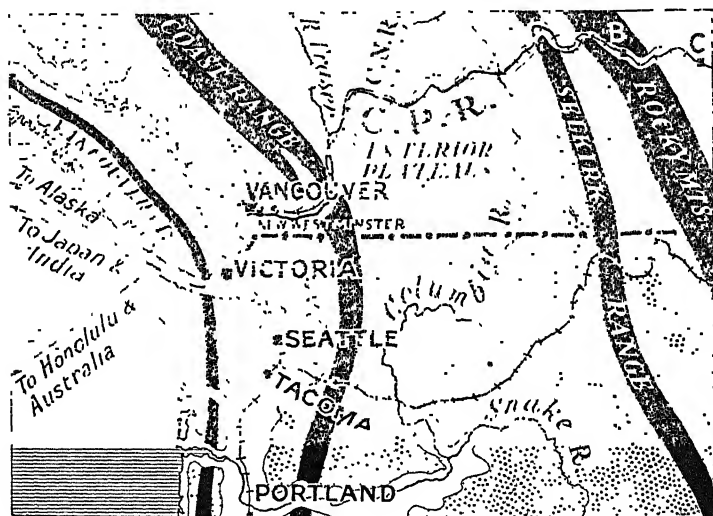


FIG. 28.—Southern British Columbia and the north-western States.
B = Banff; C = Calgary. Coast Range now called Coast Mountains.

are thickly forested. *Prince Rupert*, near the mouth of the Skeena River, is connected inland by one of the lines of the Canadian National Railway and has fish-freezing, fish-canning works and timber mills. There are a number of smaller fishing and lumbering settlements along the coast of the mainland. The gigantic Kitimat scheme for the manufacture of aluminium brings water through a 10-mile tunnel to the power-house constructed inside a mountain. North of Prince Rupert the Pacific slopes of the Coast Mountains form the "pan handle" of Alaska.

(d) The *Interior Plateaus and Ranges* occupy most of the heart of British Columbia. Some of the plateaus are so cut off from rain-bearing winds as to be almost deserts. In the south the beautiful Kootenay, Arrow, and other lakes occupy some of the valleys;

others are irrigated and with a bright sunny climate produce excellent crops of fruit (notably apples) and vegetables. The mining activity of this southern area centres on the Sullivan lead-zinc mine and the smelting works of Trail and the small town of Nelson. Hydro-electric power is available from the rivers. A line of the C.P.R. threads its way through this southern succession of ranges and valleys, but the main routeway is that of the narrow valley of the Fraser and its tributary the Thompson. The main line of the C.P.R. (leading to Kicking Horse Pass) and of the C.N.R. (leading to the Yellowhead Pass farther north) and a motor road all use this route.

(e) The *Columbia System* and the *Rockies* separated by the deep Rocky Mountain Trench stretching for over 500 miles form the

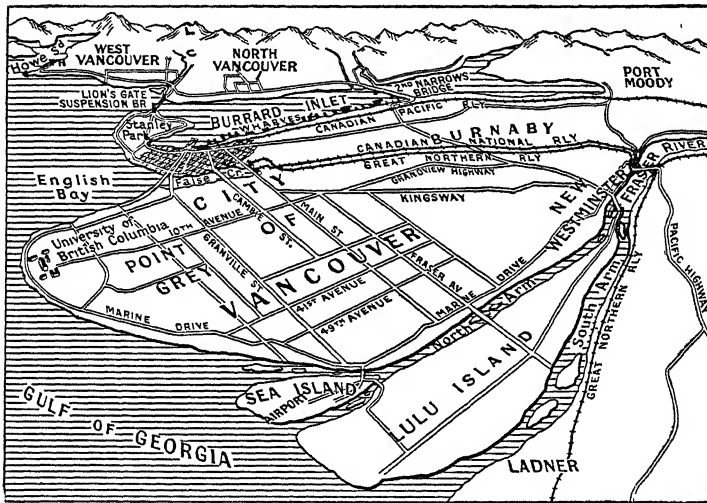


FIG. 29.—The site of Vancouver.

A diagrammatic bird's-eye view looking northwards.

easternmost division. Beautiful lakes such as Lake Louise and Emerald Lake and the magnificent mountain scenery of the national parks attract thousands of tourists annually. Coal is worked in small fields in the south at Fernie near Crow's Nest Pass and cement is made from limestone near Banff. Most of the forests are somewhat inaccessible but are now being exploited.

The *Territory of Yukon*, lying north of British Columbia, has a somewhat similar physical build, but is too remote and its climate too rigorous to attract many people, whilst its once famous goldfields are no longer significant. The building of the Alcan or Alaska Highway as a wartime measure in the Second World War from Edmonton to Fairbanks in Alaska, via Whitehorse, may do something to open up this country (see Fig. 13).

THE UNITED STATES

Position and Size. The great republic known as the United States of America was founded in 1776 when, on July 4, the Declaration of Independence of the thirteen States of which the American Union then consisted was adopted by Congress. Great Britain acknowledged the independence of the United States in 1782, and the treaty of peace was concluded the following year. The form of government in the United States is based on the Constitution of September 17, 1787, to which ten amendments were added in 1791, and twelve subsequent amendments at intervals from 1798 to 1951. The executive power is vested in a President, who holds office for four years. The Union now comprises 50 States in all, each with its own Constitution, which must, however, be republican in form. The Governor of each State is chosen by direct vote of the people over the whole State. The former "Territories" of Hawaii and Alaska each became a State in 1959. The District of Columbia, co-extensive with the city of Washington, is the seat of the United States Government.

The total area of the continental United States is 2,977,128 square miles; of non-contiguous territory, including Alaska, 581,702 square miles, making a total of 3,558,830. These areas exclude water. Total population given below includes soldiers, etc., abroad. Population of continental United States: 1910, 91,972,266; 1920, 105,710,620; 1930, 122,775,046; 1940, 131,669,275; 1950, 150,697,361. The following table of the areas and populations of the States is given for reference purposes:

THE UNITED STATES

States, State Capitals, Areas and Populations.

State	Area in square miles	Population				Per sq. mile 1950
		1920	1930	1940	1950	
Maine (Augusta)	31,040	768,014	797,423	847,226	913,774	29.5
New Hampshire (Concord)	9,024	443,083	465,293	491,524	533,242	59.2
Vermont (Montpelier)	9,278	352,428	359,611	359,231	377,747	42.6
Massachusetts (Boston)	7,907	3,852,356	4,249,614	4,316,721	4,690,514	586.2
Rhode Island (Providence)	1,058	604,397	687,497	713,340	791,896	748.4
Connecticut (Hartford)	4,899	1,380,631	1,606,903	1,709,242	2,007,280	409.7
New York (Albany)	47,929	10,385,227	12,588,066	13,479,142	14,830,192	309.4
New Jersey (Trenton)	7,522	3,155,900	4,041,334	4,160,165	4,835,329	642.8
Pennsylvania (Harrisburg)	45,045	8,720,017	9,631,350	9,900,180	10,498,012	233.0
Ohio (Columbus)	41,122	5,759,394	6,646,697	6,907,612	7,946,627	193.2
Indiana (Indianapolis)	36,205	2,930,390	3,238,503	3,427,796	3,934,224	108.6
Illinois (Springfield)	55,947	6,485,280	7,630,654	7,897,241	8,712,176	156.6
Michigan (Lansing)	57,022	3,668,412	4,842,325	5,256,106	6,371,766	111.7
Wisconsin (Madison)	54,715	2,632,067	2,939,006	3,137,587	3,434,575	62.7
Minnesota (St. Paul)	80,009	2,387,125	2,563,953	2,792,300	2,982,483	37.2
Iowa (Des Moines)	55,986	2,404,021	2,470,939	2,538,268	2,621,073	46.8
Missouri (Jefferson City)	69,270	3,404,055	3,629,367	3,784,664	3,954,653	57.0
North Dakota (Bismarck)	70,054	646,872	680,845	641,935	619,636	8.8
South Dakota (Pierre)	76,536	636,547	692,849	642,961	652,740	8.5
Nebraska (Lincoln)	76,653	1,296,372	1,377,963	1,315,834	1,325,510	17.2
Kansas (Topeka)	82,113	1,769,257	1,880,999	1,801,028	1,905,299	23.2

State	Area in square miles	Population				Per sq. mile 1950
		1920	1930	1940	1950	
Delaware (Dover) . . .	1,978	223,003	238,380	266,505	318,085	160.8
Maryland (Annapolis) . .	9,887	1,449,661	1,631,526	1,821,244	2,343,001	236.9
District of Columbia . .	61	437,571	486,869	663,091	802,178	13,150.4
Virginia (Richmond) . .	39,899	2,309,187	2,421,851	2,677,773	3,318,680	83.1
West Virginia (Charleston)	24,090	1,463,701	1,729,205	1,901,974	2,005,552	83.2
North Carolina (Raleigh) .	49,142	2,559,123	3,170,276	3,571,623	4,061,929	82.6
South Carolina (Columbia)	30,594	1,683,724	1,738,765	1,899,804	2,117,027	69.1
Georgia (Atlanta) . . .	58,518	2,895,832	2,908,506	3,123,723	3,444,578	58.8
Florida (Tallahassee) . .	54,262	968,470	1,468,211	1,897,414	2,771,305	51.0
Kentucky (Frankfort) . .	40,109	2,416,630	2,614,589	2,845,627	2,744,806	73.4
Tennessee (Nashville) . .	41,961	2,337,885	2,616,556	2,915,841	3,291,718	78.4
Alabama (Montgomery) . .	51,078	2,348,174	2,646,248	2,832,961	3,061,743	59.9
Mississippi (Jackson) . .	47,420	1,790,618	2,009,821	2,183,796	2,178,914	45.9
Arkansas (Little Rock) . .	52,725	1,752,204	1,854,482	1,949,387	1,909,511	36.2
Louisiana (Baton Rouge) .	45,177	1,798,509	2,101,593	2,363,880	2,683,516	59.4
Oklahoma (Oklahoma City)	69,283	2,028,283	2,396,040	2,336,434	2,233,351	32.2
Texas (Austin) . . .	263,644	4,663,228	5,824,715	6,414,824	7,711,194	29.2
Montana (Helena) . . .	146,316	548,889	537,606	529,456	591,024	4.0
Idaho (Boise) . . .	82,808	431,866	445,032	534,873	588,637	7.1
Wyoming (Cheyenne) . . .	97,506	194,402	225,565	250,742	290,529	2.9
Colorado (Denver) . . .	103,967	939,629	1,035,791	1,123,296	1,325,089	12.7
New Mexico (Sante Fe) . .	121,511	360,350	423,317	531,818	681,187	5.6
Arizona (Phoenix) . . .	113,580	334,162	435,573	499,261	749,587	6.5
Utah (Salt Lake City) . .	82,346	449,396	507,847	550,310	688,862	8.3
Nevada (Carson City) . .	109,802	77,407	91,558	110,247	160,083	1.4
Washington (Olympia) . .	66,977	1,356,621	1,563,396	1,736,191	2,378,963	35.5
Oregon (Salem) . . .	96,350	783,389	953,786	1,089,684	1,521,341	15.7
California (Sacramento) .	156,803	3,426,861	5,677,251	6,907,387	10,586,223	67.5
Continental United States .	2,977,128	105,710,620	122,775,046	131,669,275	150,697,361	50.5

Territories and Possessions

Alaska (Juneau) . . .	571,065	55,036	59,278	72,524	126,661	0.2
Hawaii (Honolulu) . . .	6,441	255,912	368,336	423,330	493,437	76.6
Puerto Rico (San Juan) .	3,423	1,299,809	1,543,913	1,869,255	2,205,398	644.2
Philippine Islands (Manila)	114,400	10,314,310	12,082,366	16,356,000		
American Virgin Islands .	132	26,051	22,012	24,809	26,654	201.9
Samoa . . .	76	8,056	10,055	12,908	18,602	244.7
Guam . . .	203	13,275	18,509	22,290	58,754	289.4
Panama Canal Zone . . .	362	22,858	39,467	57,827	52,300	144.4
	3,558,830 ¹	117,823,165	137,008,435	150,621,231	153,679,167	43.1

Totals in 1930 and 1940 include soldiers abroad.

The Philippine Islands are now independent.

¹ By the end of 1959, population of Continental United States exceeded 178,000,000. 1950 total excludes the Philippine Islands, included in previous years.

Whilst the total area of the United States is thus not far short of that of Canada, and the area of the continental States roughly equal to that of Australia, the States are far more favourably situated than either Canada or Australia and have a much larger proportion of cultivable land and are capable of supporting a far larger population. Lying wholly within the North Temperate Zone (excluding non-contiguous territory) and avoiding both the frozen deserts of the North, and the difficult regions of the hot wet forests of the equator, the situation of the United States is almost ideal. Only the natural products of equatorial climes—of which rubber is the most important—cannot be produced at home.

Physical Features. Out of the five major physical divisions of the North American continent, the United States includes the whole of the *Atlantic and Gulf Coastal Plains*, a large part of the *Western*

Cordillera (stretching a third of the way across the country) and of the *Interior* or *Central Plains*, together with the larger part of the *Appalachian Highlands*, but only a small fragment of the *Canadian Shield*.

The *Appalachian Highlands* occupy a large and important area in the east where there are plateaus but especially a succession of fold ridges trending south-west to north-east. This alignment caused the mountains to be barriers to the spread of the early settlers into the interior and slows down communications even at the present day.

The *Interior Plains* comprise several subdivisions:

(a) The Interior Lowlands are very extensive and drained by the Mississippi and its tributaries the Missouri and Ohio and were once occupied by the rich grasslands or Tall Grass Prairies and deciduous forests.

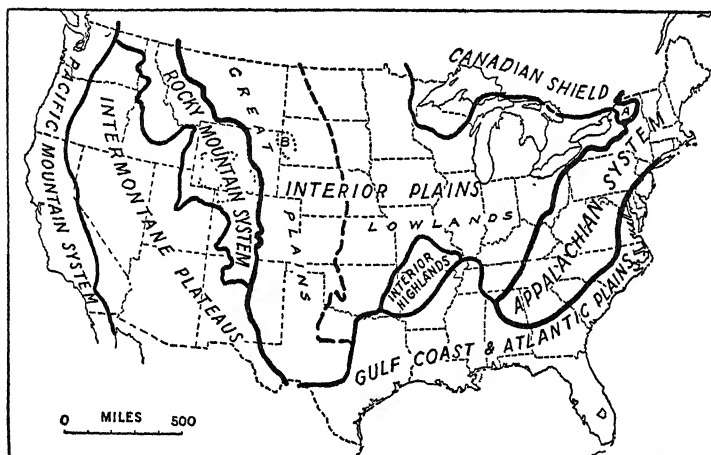


FIG. 30.—Main physiographic regions of the United States.

A=Adirondacks; B=Black Hills; dotted=Wyoming Basin.

(b) The High Plains or Great Plains, generally semi-arid grassland, rise gradually from the Interior Lowlands to the foot of the Rockies. Approaching the Rockies in South Dakota the High Plains are interrupted by the granite mass of the Black Hills (B on Fig. 30).

(c) The wooded Interior Highlands rise from the plains like a double “island”—the Ozark and Ouachita Highlands separated by the Arkansas Valley—of old rocks rich in minerals.

The *Coastal Plains* include:

(a) The humid, sub-tropical Gulf Coast Plains with the Mississippi Delta stretch eastwards and swing round the southern end of the Appalachians, giving off the low, broad peninsula of Florida.

(b) The Atlantic Coast Plains are a natural continuation northwards.

The *Western Cordillera* or Western Mountain System comprises at least three subdivisions:

(a) The Rocky Mountains, less spectacular and rising less abruptly from the Great Plains than in Canada, are separated into northern and southern sections by the Wyoming Basin (dotted on Fig. 30).

(b) The generally arid Intermontane Plateaus or Basin and Range Province with many plateaus or high-level basins separated by ranges.

(c) The Pacific Mountain System includes the Cascade-Sierra Nevada ranges, the Coastal Ranges, and the intervening valleys, notably the great valley of California.

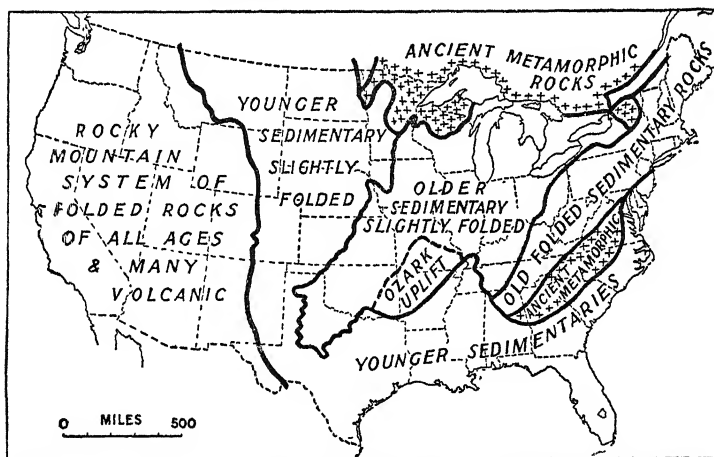


FIG. 31.—Outline geological map of the United States.

The *Canadian Shield* extends south of the international border into the Adirondack Mountains of New York State (A on Fig. 30) and a larger section around Lake Superior.

It should be noted that the main water-parting in the United States, separating the Pacific drainage from the Atlantic, is roughly along the crestline of the Rockies.

Geology. Fig. 31 is a simplified geological map of the United States. It should be remembered that, during the Great Ice Age, vast ice-sheets covered the north of the continent, with the result that surface deposits—boulder clays, gravels, sands, loess, and glacial lake silts—were left distributed over huge areas when the ice sheets melted. The importance of these drift deposits will be discussed later. Otherwise the geological map shows how closely the relief depends upon underlying structure.

The *Appalachian System* is a highly folded belt, the folds usually running from south-west to north-east. Along the east a mass of ancient crystalline rocks underlies the Piedmont Plateau and there are other tracts of old rocks in other parts. Some sections are highly mineralized, so that metalliferous ores are widespread. Most important, however, is the great western plateau where the sedimentary rocks include the world's largest coalfield.

The *Central Plains*. With the exception of the part of the Canadian Shield which lies south of the border around Lake Superior and the similar ancient mass of the Adirondacks, and the "island" of old rocks of the Ozark-Ouachita Highlands, the Central Plains are underlain by sedimentary rocks only slightly folded. They vary greatly in age, however, older rocks occurring in the east, younger in the west. The older rocks under the Central Lowlands include large coal basins and some important oilfields. Amongst the younger rocks underlying the Great Plains or Short Grass region are large reserves of sub-bituminous coals and lignites as well as important oil pools.

The *Gulf and Atlantic Coastal Plains* are underlain by young marine sediments or by river alluvium.

The *Western Mountain System* is, geologically, a highly complex area. There are great areas in the Rocky Mountains of much-folded rocks broken into huge blocks by faults and frequently with the blocks severely tilted or even thrust over one another. There are also great blocks of ancient mineralized rocks. In places (notably in the Snake River Plateau and Yellowstone) these may be covered by huge spreads of lava. In the western ranges are often very large intrusive masses of granite, but many of the highest peaks are extinct volcanoes (e.g. Mt. Rainier and Mt. Hood). In the west—southern California—younger sedimentary rocks harbour great oil pools.

Minerals. The annual output of minerals from the United States is immense and varied. Coal and oil vie for first place in point of value; iron ore, natural gas, gold, copper ores, materials for cement, silver ore, lead ore, and zinc ore are all important.

Coal. The United States now produces 33 to 40 per cent. of the world's coal—between 400 and 500 million tons a year. The distribution and output of the fields has been discussed in Part I (see pp. 202–204 and Fig. 143) and will not be repeated here. The high quality and the great quantity of coal in the United States, combined with the relative ease with which it is mined and the situation of the best coal in the east, have been the main factors in determining the rise of the country to her present leading position amongst industrial nations. Roughly a third of the coal produced is devoted to industrial uses, in addition to that used in the production of coke—largely for iron-smelting purposes. A fifth of

the whole is consumed by the railroads, and a seventh by electric power works.

Petroleum. Oil in the United States has also been discussed in Part I (pp. 213-214, Fig. 150). In the early days of the industry, from 1859 to 1875, Pennsylvania was practically the only producing State, and petroleum found its chief use as an illuminant before the coming of electricity. Very broadly speaking the oils of the eastern States are *light*, and yield large quantities of gasoline or petrol and kerosene; the oils of the western States are, on the whole, heavier, and a considerable proportion is used in a crude state as fuel oil. In addition to a production which for many years was two-thirds of the world's total, the United States controls much of the production of Mexico and South America, with the result that petroleum and

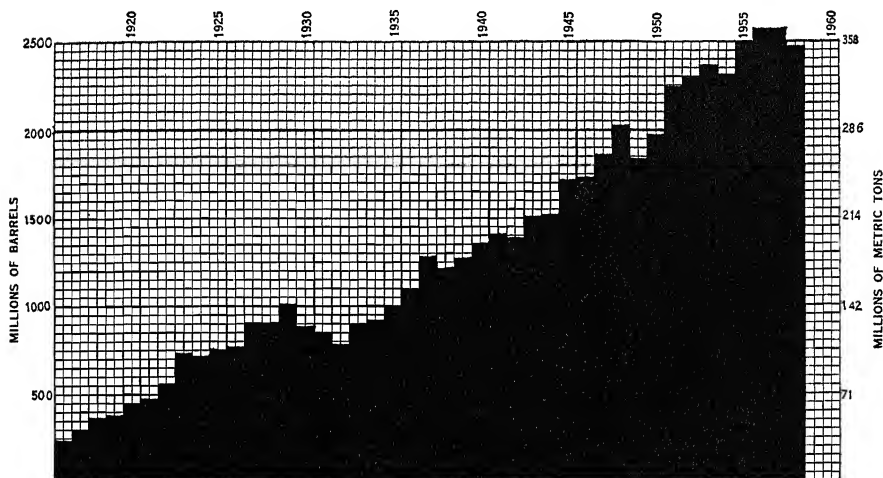


FIG. 32.—The production of crude oil in the United States.

petroleum products figure amongst the leading exports. The huge production of petroleum in the United States has resulted in the development of specialized means of transport. Pipe-lines, through which the oil is pumped by means of powerful pumps placed at intervals of 15 to 30 miles, connect the mid-continent and eastern fields with the lakeside industrial regions and the Atlantic coast. The Californian output is handled largely by "oil tankers" and petroleum ranks first in quantity and value of the commodities passing through the Panama Canal.

Natural gas occurs both in the oil territory and also by itself. A large source is the northern portion of the Appalachian oilfield. Enormous quantities have been allowed to escape and to be completely wasted; the value of that portion which is utilized is said to be greater than the value of the gold and silver production

combined. Much of the gas is used in industrial plants and for domestic purposes in the area of production; large quantities are piped to the Erie lakeside towns.

Iron Ore. Of all the industries of the United States, the production of iron and steel is the most important, if the amount of capital sunk in the industry be taken as a criterion. The distribution and production of the ore has been discussed in Part I (see pp. 226-227 and Fig. 156). As explained there, the greatest iron mines, in Minnesota, are a thousand miles from the region where the best coking coals are produced (Pennsylvania). But the seriousness of this distance is minimized by the presence of the Great Lakes. Nearly all the iron ore moves eastward towards the fuel, not only because the early use of local iron ore caused the smelting works

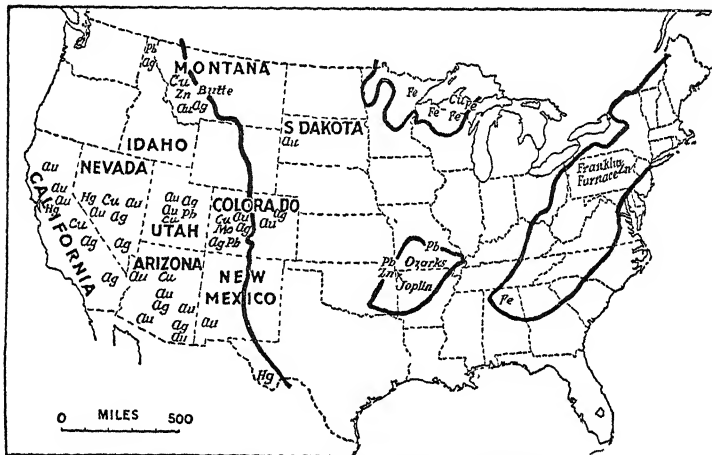


FIG. 33.—The minerals of the United States.

Ag=silver; Au=gold; Cu=copper; Hg=mercury; Fe=iron; Pb=lead; Zn=zinc;
Mo=molybdenum.

to be established there, but because the markets for the products are mainly in the north-east. The Pittsburgh area is still the leading steel-producing region, followed by the Michigan and Erie lakeside towns and by the Birmingham area.

Other Metalliferous Ores. As one would expect, the ores of the metalliferous minerals are found mainly in the mineralized zones of the old rocks, (a) in the Western Cordillera, (b) in the ancient "island" of the Ozarks, (c) in the Canadian Shield extension, (d) in the older rocks of the Appalachians.

The United States produces about a third of the world's *copper*—in the western states of Montana, Utah, and Arizona, which calls itself the "Copper State," and also in Michigan. *Gold* is obtained almost exclusively from the western states, including South Dakota

(Black Hills). California calls itself the "Golden State," but Colorado, Utah, Arizona, and Nevada are also producers. *Silver* also comes mainly from the west, where Nevada is styled the "Silver State," but *lead* and *zinc* come especially from the Joplin district of the Ozarks as well as the mountain states. For *zinc* Franklin Furnace in New Jersey is a famous old locality. The United States is the world's leading producer of *aluminium* and the bulk of the ore (bauxite) is obtained in Arkansas or imported through Gulf ports from the Guianas.

Clay and clay products and *cement* reach a very high value, but as far as possible each great city obtains its bricks, tiles, concrete blocks, cement, and other materials locally. Some famous *building stones* are widely used such as granites and marbles from New England and the limestones of southern Indiana. *Phosphates* for manures are obtained in large quantities in Florida, *sulphur* along the Gulf Coast of Louisiana and Texas. *Salt* is obtained by the evaporation of brine (Great Salt Lake, Michigan, and Ohio) or sea water (California). Grants (New Mexico) has the world's largest uranium deposit.

Climates and Soils. We have already considered the climatic conditions and climatic regions of North America (see Fig. 9). Summarizing for the United States, it can be said that the 100th meridian—coinciding in part with the annual rainfall line of 20 inches—divides the country into two halves. Most of the country to the west is dry, most to the east has adequate moisture for crop farming.

In the West—

(1) The Cool Temperate or Mid-Latitude Oceanic Climate like that of north-west Europe, with mild winters, cool summers, and a good rainfall all the year from the Westerlies (maximum in winter), is found in the Northern Pacific Province—the coastlands north of San Francisco.

(2) The Mediterranean Climate with winter rain is found in the Southern Pacific Province or California. The coastal sections have mild wet winters and cool foggy but rainless summers. Inland, especially in the Central Valley, conditions are more "continental."

(3) Mid-Latitude Desert and Semi-Desert Climates (colder in the north) are found in the Intermontane Plateaus of the Western Cordillera. In general there is increasing aridity southwards.

(4) Mid-Latitude Continental or Steppe Climate is found in the Great Plains or Plains Province. It is notable for its severe winters, hot summers and scanty precipitation (early summer maximum).

In the East—

(5) Mid-Latitude Continental Climate, but with better rainfall, gives rise to the richer lands of the Interior Lowlands.

(6) The Warm Temperate East Coast Climate is that of the Gulf

Province or Gulf Coast and South Atlantic Plain. It has comparatively mild winters, hot humid summers, and a well-distributed rainfall.

(7) The Cold Temperate East Coast Climate is that found in the north-eastern states. It differs from the last mainly in the greater length, storminess, and severity of its winters, hence the term Humid Continental.

Soils. The great soil belts of the world depend first on climate; locally the differences are due to the character of the parent rock material, that is, to geology.

In those parts of the United States with less than 20 inches of rainfall the annual evaporation from the ground is more than the water received annually from rain, so the *upward* movement of water through the soil and its evaporation causes salts, especially lime, to be left behind. These lime-rich soils are called pedocals. Where there is very little rain saline desert soils result. In the less arid parts of the prairies there is a broad belt of rich dark soil like the "black earth" or chernozem of Russia, which is very fertile. In this belt there is an approximate balance between the upward and downward movement of water.

Farther east are brown forest soils, owing their colour and their richness to the decaying vegetable matter from the leaves of the forest trees. Here, rainfall is greater than evaporation and soluble salts tend to be washed *downwards* (a process known as leaching). The resulting soils are often deficient in lime but rich in aluminium (Al) and iron (Fe); hence the general term *pedalfer*.

When soils are covered with forests, the annual leaf fall enriches the soil through the humus formed from the leaves. When the forest is cut down and the land farmed this organic matter may be quickly lost if care is not taken to add manures and fertilize the land. Further, soil exposed to rainstorms is easily washed away, especially on slopes. Enormous quantities of soil have been lost in this way. For example, the Mississippi alone carries to the sea some 400,000,000 tons of soil each year. Vast areas of the United States, once flourishing forest on good soil, have become almost desert wastes through soil erosion. Efforts are being made all over the country to prevent this from happening further. Slopes which have been washed bare of soil are being grassed over or the woodland encouraged to establish itself again. On more gentle slopes where the land is ploughed the plough is taken round the hill (contour ploughing) instead of up and down, whilst stream banks are planted with grass. Soil erosion not only ruins the land, but the soil which is swept away clogs the rivers and causes flooding as well as filling reservoirs which may have been constructed.

Irrigation. Many parts of the United States are very dry and farming may be impossible. Yet these parts may have excellent

temperature conditions and soils and can be made very productive if only water is available. Some very large irrigation schemes have accordingly been undertaken.

The *Grand Coulee Dam* on the Columbia River in the State of Washington is the largest in the world. It began operating in 1941 and will eventually irrigate more than 1,000,000 acres. It also supplies power to the industrial cities of the Puget Sound area.

Boulder Dam on the Colorado River between Arizona and Nevada is the highest in the world. It supplies power to the Los Angeles area, including the world's largest magnesium plant, and irrigation water to large areas in southern California.

Shasta Dam on the Sacramento River (California) was finished in 1944 and brings much-needed water to the thirsty though fertile soils of the Great Valley.

Friant Dam (California) and *Marshall Ford Dam* (Texas) are two other very large projects amongst the 179 built by the Bureau of Reclamation since 1902 at a cost of \$1,000,000,000. The works operated by this Bureau irrigate over 4,000,000 acres where 5,000,000 people live.

Natural Vegetation. The natural vegetation which once covered North America has already been described in broad outline above. The diagram (Fig. 35) shows the proportion of the surface formerly covered by each of the main types. Fig. 34 shows the distribution of the main types in greater detail.

Forest. The forest vegetation falls naturally into two groups, the eastern forests and the western forests, separated by the broad belt of grassland occupying the central plains. The eastern forests are mainly of broad-leaved trees, and stretch alike over mountains and valleys; the western forests are mainly of coniferous trees and roughly co-extensive with the Rocky Mountains, Cascade-Sierra Nevada and Coast Ranges. The eastern forests probably covered originally about 1,000,000 square miles, of which less than a quarter is still occupied by forest with merchantable timber. The western forests still correspond fairly closely with their original limits, though large areas have been ruthlessly exploited and big tracts virtually destroyed by forest fires.

The Eastern Forests include seven main natural types, the distribution of which is shown in Fig. 34.

(a) The northern coniferous forest of spruce and fir—a continuation of the great forest areas of Canada.

(b) The north-eastern pine forest of jack-pine, Norway pine and white pine, confined mainly to the Lake States, that is to the region south of the Great Lakes.

(c) The north-eastern hardwood forest with beech, birch, maple, and hemlock also occurs south of the Great Lakes, but is especially

characteristic of the St. Lawrence basin and the northern part of the New England States.

(d) The southern hardwood forest, in which oaks are the dominant trees, occupies the southern part of the Cool Temperate Region marked in Fig. 9. Over most of the Appalachian highland the oaks are associated with chestnuts and yellow poplar; to the north-west in western Ohio, Indiana, and Missouri with hickory; to the south-east with short-leaf pine, scrub pine, and pitch-pine. On the west the boundary between the hardwood forest and the prairies is a very intricate one, the forest occupying the valleys, the prairies the intervening plateaus. Indeed, the southern hardwood forest penetrates the heart of the prairies along the larger river valleys.

(e-f) The south-eastern forests comprise two distinct types. The south-eastern pine forests of long-leaf pine and other pines are a valuable source of timber and occupy a broad belt along the Gulf Coast and Atlantic coastal plains. The river-bottom forests of cypress, red gum, tupelo, and oaks occupy the valleys in the same tract. The "sloughs" of the river-bottoms remain under water for much of the growing season; the "glades" are only subject to overflow for limited periods.

(g) A strip of mangrove forest occurs along the west coast of Florida.

The Western Forests comprise five main types:

(a) The northern coniferous forest of spruce and fir extends south of the Canadian border and is found near the crest of the Cascades, Rockies, and other main ranges.

(b) The north-western coniferous forest comprises the great forests of Douglas fir on the Pacific slopes of the Cascades, the red-wood forests on the coastal strip farther south and the western white pine and larch region of Western Montana and Northern Idaho. Throughout the western region red cedar and hemlock tend to be the most important trees.

(c) The western pine forest of yellow pine and Douglas fir, with sugar pine and lodgepole pine, occupies large and important areas especially in the Columbia river basin.

(d) The south-western coniferous woodland of pines and juniper occupies large areas especially in the Great Basin. But the timber is all small and its chief use is for fence posts and fuel for local use.

(e) Chaparral, the typical Mediterranean vegetation, is a mixed woodland of stunted oaks, cherry, and other trees which vary from place to place, and occupies the lower hills and mountains of California.

Grassland. The two principal types of grassland are the tall grass of the true Prairies, and the short grass of the western prairies or "plains." More specialized types are the desert savana of Texas;

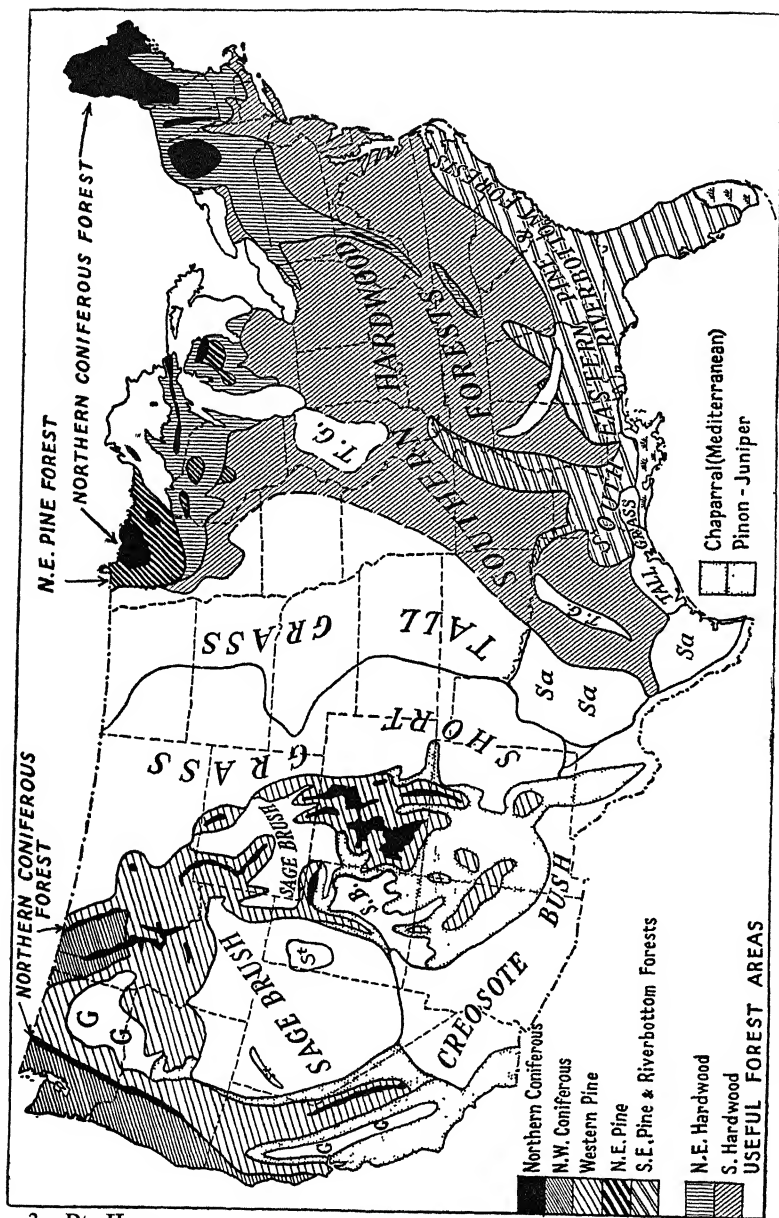


FIG. 34.—Vegetation map of the United States (adapted from the Atlas of American Agriculture).

G=grass, T.G.=tall grass, Sa=Savanna; S.B.=sage-brush.

the bunch grass of the Californian Valley and central part of the Columbia Basin, and the various patches of Alpine and marsh grass.

Desert. Apart from the desert grassland already mentioned, the desert vegetation consists mainly of stunted scrub. Three types may be recognized, the sage-brush of the northern desert area, the creosote bush of the southern desert area, and the more specialized greasewood of the salt deserts.

Forest Products. From the above account of the forest belts, it will be evident that the merchantable timber is derived from several areas. The four main areas of softwood may be mentioned:

(1) New England and (2) The Great Lake states all now consume more than they produce except Maine, and, to a less extent, so do New Hampshire and Vermont.

(3) The Gulf States now supply the most important soft timber—yellow pine.

(4) The Pacific States have the largest reserves (especially of Douglas fir) and Washington is now the leading lumber state.

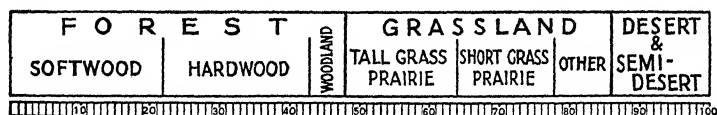


FIG. 35.—The vegetation of the United States (proportions).

Large areas of former forest are now farmland, but there are also huge tracts of "cut-over" land where the valuable trees have been replaced by "forest weeds" of little value. In the west, the forests are found on the mountains and higher hills; in the north-west they also cover lower ground. Here much more of the forest remains, though forest fires have destroyed and continue to destroy large areas.

The *lumber industry* is important in a number of states, but by far the greatest producers are Washington and Oregon together with the neighbouring parts of northern California and Idaho. Douglas fir and western yellow pine are the leading timbers. Next in importance are the south-eastern (Gulf Coast) states, famed for their pitch-pine. In the north-eastern and Great Lake states the forests have been so cut over that these areas produce less than a quarter of the timber they use.

The *pulp and paper industry* is widespread, but the pulpwood supplies (especially of spruce) do not suffice for more than a small fraction of the enormous home demand for paper. In a single year more than 100 lb. of paper are used in one form or another by every man, woman, and child in the United States. The bulk comes from Canada.

Other forest products include "naval stores," a term commonly used to include turpentine, resin, and pine-tar obtained by distillation after "tapping" the long-leaf pines of the south-eastern states, especially Florida.

Imported materials have replaced the former use of oak bark and hemlock bark for tanning purposes. The furniture-making industry uses plywoods and imported hardwoods rather than local hardwoods. Similarly, the once important wooden carriage building industry has completely changed—the raw material in this and also for agricultural implements is mainly steel, though many of the old centres, based originally on local supplies of hardwood, still carry on the work. This is a good example of "industrial momentum."

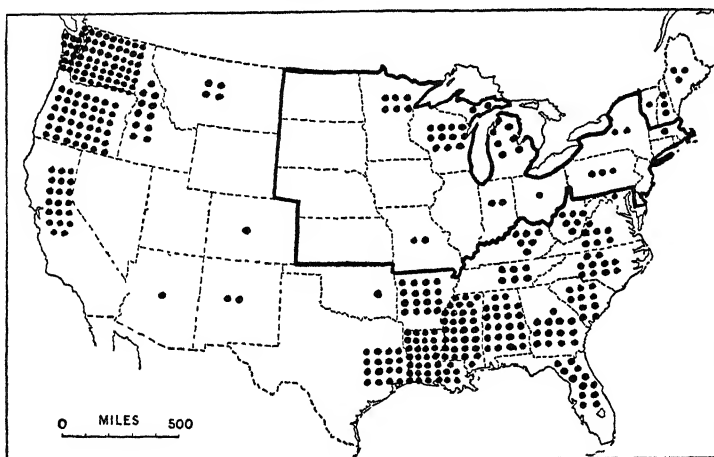


FIG. 36.—Timber production in the United States.

The dots show the comparative output of lumber. The states within the black line consume at least four times as much as they produce

Forest Conservation. The forests of the United States were very quickly and often wastefully cut over and no attempt made to restore them. So long as forest land remained so abundant and so cheap the need was not apparent. Large areas were destroyed by fire and remained waste. Now efforts are being made to conserve the forests in the west and they are being scientifically managed by individual states or as national forests. Less is done in the eastern states, where the forests are mostly privately owned.

Grassland. The natural grassland of the richer prairies has entirely disappeared under the plough. Only the poorer areas remain in the west, much as they were in the past, though many of these have depreciated owing to overgrazing.

Agriculture. Despite the enormous importance of industry, the greater part of the United States is essentially agricultural and in very

many of the states farming is easily the leading occupation. There are between five and six million farms and the area of "improved" farmland is over 500,000,000 acres—more than a quarter of the total area of the country. Thus the average farm has nearly 100 acres of improved land and the total acreage is over six times that of Canada. Including range land and unimproved land, farms cover well over 1,000,000,000 acres, or over half of the area of the country (excluding Alaska).

The following tables are included to illustrate the relative importance of the various field crops and farm animals:¹

MILLIONS OF ACRES

	1909-13	1922-25	1937-38	1952
Farm area	955.9	955.92	986.82	1,158.62
Improved land	478.52	503.12	522.42	532.12
Corn (maize)	104.2	102.4	82.5	81.4
Wheat	47.1	58.6	76.0	70.6
Oats	37.3	42.4	35.5	38.6
Barley	7.6	7.6	10.1	8.3
Rye	3.2	5.0	3.9	1.4
Cotton	34.1	39.4	34.3	25.0
Tobacco	1.2	1.8	1.7	1.3

MILLIONS

Live stock	1913	1921-25	1938	1953
Horses	12.0	17.2	11.2	3.9
Mules	4.5	5.7	4.5	1.8
Cattle	56.6	64.0	65.9	93.7
Sheep	49.7	38.4	52.9	31.6
Swine	58.9	60.2	44.4	54.6

¹ Keep up to date from the *International Year Book of Agricultural Statistics*

² Census returns, 1910, 1920, 1930, and 1950 respectively.

These tables suggest that the period of expansion of acreage is not only past but that land has been abandoned and many crops occupy a decreasing area, though yields are improving as described below.

By far the most important crops from the standpoint of the area they occupy are maize and wheat—between them covering nearly one-third of all the improved farmland. Next come oats and cotton; others follow far behind.

Wheat. As suggested by Fig. 16, there are four main wheat-growing areas:

- (a) The Spring Wheat Belt, lying mainly in North Dakota, which is a continuation of the Canadian prairie wheat region.

- (b) The Winter Wheat Belt, lying especially in Kansas, Nebraska, Oklahoma, and northern Texas. This is a dry region, producing hard wheat which makes good bread and certain types of very good macaroni. This area produces more than half the wheat of the United States, Kansas being easily the leading state.
- (c) The Columbia Plateau, especially the Palouse country, in the State of Washington.
- (d) The wheatlands which lie in the main Corn Belt or in the Corn-Winter Wheat Belt to the south.

In good years the wheat harvest exceeds 1,000,000,000 bushels, but the yield per acre on the huge "extensive" farms which often grow almost exclusively this one crop is still very small when compared

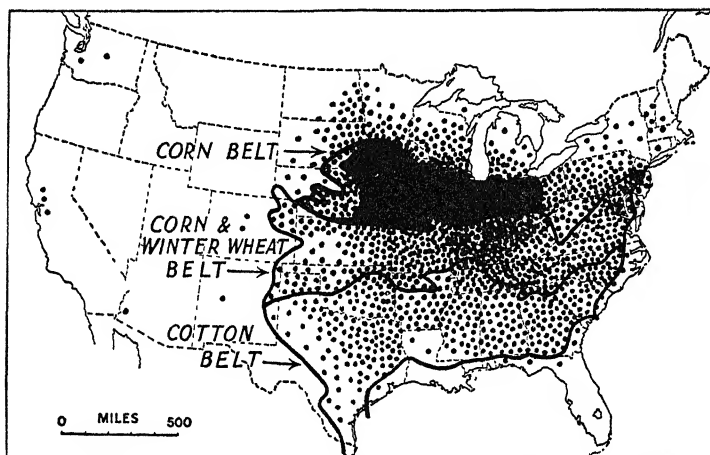


FIG. 37.—The corn-growing land of the United States.

Each dot represents 1,000,000 bushels.

with the intensively farmed lands of Europe. The yield of 14–18 bushels per acre in the United States contrasts with 34–45 in England or Denmark but the yield in the United States increased markedly during the Second World War.

Nearly all the wheat is bulk-handled. That from the spring wheat areas goes to the Great Lakes ports of Superior and Duluth; from others areas the movement is by rail. Flour-milling is concentrated in Minneapolis, Chicago, St. Louis, Kansas City, Wichita, and Buffalo. Despite the huge production the surplus available for export is often small—less than a quarter of the crop.

Corn (Maize). In many years the corn harvest is greater than all other cereal crops combined, but nearly 85 per cent. never leaves the farms on which it is produced, being fed to cattle and pigs.

Less than 10 per cent. is used as human food. As shown in Fig. 37, there is a very remarkable concentration of production in the Corn Belt; it is also the leading cereal over most of the south-eastern states, but very little is grown in the west.

The cultivation of *oats*, mainly grown for animal feed, is naturally concentrated in the cooler and damper areas of the north-east. *Barley* is likewise grown for animal feed, mostly on the lighter soils of the Spring Wheat Belt; some better types are grown for malting and the making of beer.

Rye forms only a small part of the United States cereal crop and is grown on sandy soils, too poor for wheat, of the Lake states and near the Atlantic coast. There are some people who prefer rye bread, dark in colour, close in texture and rather acid in flavour, though American rye bread is really wheat bread flavoured with rye.

Rice. The use of modern machinery has revolutionized the cultivation of rice and the arduous hand labour and laborious methods used in the East (e.g. China and India) of transplanting the young plants are not needed. Along the naturally wet sub-tropical Gulf Coast Plains and South Atlantic Coast-land and under irrigation in the great valley of California rice is produced in excess of home needs.

Buckwheat is a quickly maturing fodder grain which is therefore often planted where a late spring has ruined the possibility of a good wheat crop. *Soya beans*, introduced not many years ago, provide a valuable crop yielding oil and fodder. *Groundnuts* (peanuts) grow on poorer and lighter soils. Both are widespread in the Cotton Belt.

Sugar-cane and *sugar-beet*. Once unimportant, much sugar-cane is now grown in the subtropical belt, especially in the Mississippi delta region of Louisiana. In some years the output of cane sugar has nearly reached that of beet sugar, though normally it is only about a quarter. There is still a large import from Cuba, Hawaii, and Puerto Rico. The sugar-beet is a mid-latitude crop and is now cultivated in many of the northern and western states, frequently under irrigation.

Fruits. The production of fruit in the United States is a highly specialized industry and the consumption is enormous. Citrus fruits (oranges, grapefruit, and lemons) are sensitive to frost and are produced mainly in southern California and southern Florida. Oranges come from both states as well as from southern Texas, grapefruit especially from Florida and lemons from California. The citrus fruit growers have a very efficient marketing organization. Mediterranean fruits other than citrus flourish especially in California, where there is a great canning industry and where peaches, apricots, prunes, and raisins are also dried. There are large vineyards in California and much wine is made; grapes also ripen along the southern shores of Lakes Erie and Ontario. Apples are

important near the Great Lakes, in the Pacific States (especially adjoining the apple-growing valleys of British Columbia), in New England, and the Ozarks. The production of small fruits is also important. Various berries (strawberries, raspberries) are popular and grown widely through the country. An interesting development is the growing of cranberries, which is concentrated in old bogs as in the Cape Cod area. The very popular melons are widely grown, but choicer varieties such as the cantaloupe tend to be confined to special areas such as the irrigated land of the Imperial Valley of California.

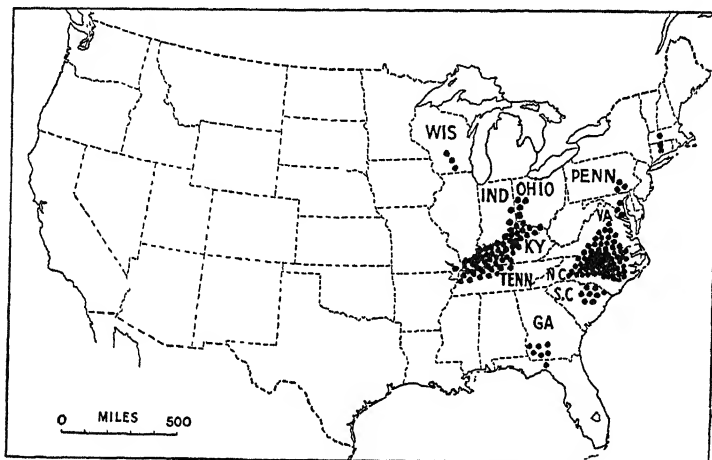


FIG. 38.—The tobacco-growing lands of the United States.

Truck farming, or the growing of vegetables, is important near many large cities but especially in the north-eastern states. Some farmers grow essentially to supply canning factories and there is a much greater degree of specialization than in the "market gardening" industry of Europe. Advantage is taken of climatic conditions in the South Atlantic Coastal Plain for winter and early vegetables and in southern California for canning and freezing.

Tobacco. The United States grows about a third of the world's tobacco, notably in Kentucky, North Carolina, and Virginia, but also in some other special areas shown in Fig. 38, such as the Connecticut Valley.

Cotton. Easily the most important of all commercial non-food crops in the United States is cotton—about half the world's total. The cotton plant needs at least 200 days free from frost for its growth cycle and so the Cotton Belt is limited on the north by the line of 200 frostless days (marked by a line of circles on Fig. 39). In the west little unirrigated cotton is grown where the rainfall is less than

23 inches a year (marked by the broken line on Fig. 39), whilst in the south Florida and the Gulf Coast margins are outside the Cotton Belt, being too damp.

The chief cotton-growing land used to be the South Atlantic states, but the boll-weevil destroyed much of the crop and chief areas of production moved westwards to the "Yazoo bottoms," or Mississippi alluvial flood-plain (3 on Fig. 39) and the black soils of Texas (marked 1 on Fig. 39). Back in the east (2 on Fig. 39) is the famous Black Belt of Alabama. On the islands off the Atlantic Coast small quantities of finest quality "Sea-Island cotton" are produced. Excellent quality "Long Stapled Uplands" comes from Louisiana and Texas (staple $1\frac{1}{8}$ to $1\frac{3}{8}$ inches long), but the bulk of American pro-

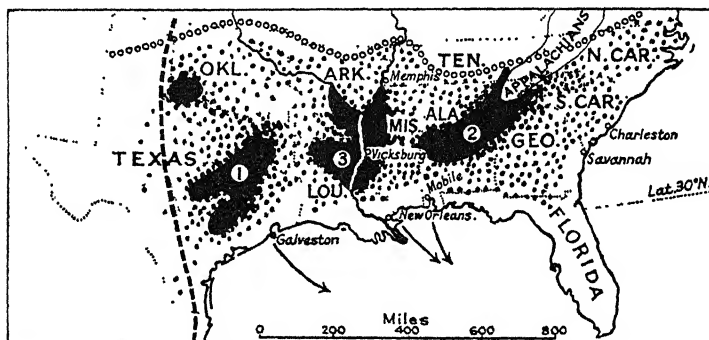


FIG. 39.—Cotton-growing lands of the United States.

duction is "Uplands"—Grade III. Even this is much better than the native cottons of India or China. First quality long-staple cotton has become very important in recent years on the irrigated lands of the southern part of the great valley in California. With the growth of textile manufacturing in the States a much smaller proportion of the cotton crop is exported.

Beef Cattle. In the United States huge numbers of cattle are reared on the great ranges of the Great Plains and western plateaus. They are mostly sent by rail to the Corn Belt but some westwards to irrigated alfalfa pastures for fattening before slaughter. Many more live and die in the Corn Belt. Slaughtering, despatch of meat in refrigerator cars, canning of meat, and preparation of meat products have become concentrated in such cities as Chicago, Kansas City, Omaha, St. Paul, St. Louis, Sioux City, and Indianapolis, but may also be found in eastern cities. A great by-product is leather—made in Chicago and Milwaukee and a number of older eastern centres.

Dairying. Milk is produced near every big city, but in the Great Lakes states and those of the north-east it is produced on a scale that is vastly greater than local needs. This is the Hay and

Dairying Belt, which supplies most of the butter and cheese of America. Wisconsin ("America's Dairyland") is the leading state for both, being specially famous for its cheese. Minnesota and Iowa are also leading butter-making states. Fodder crops and silage play a large part in maintaining the prosperity of the region.

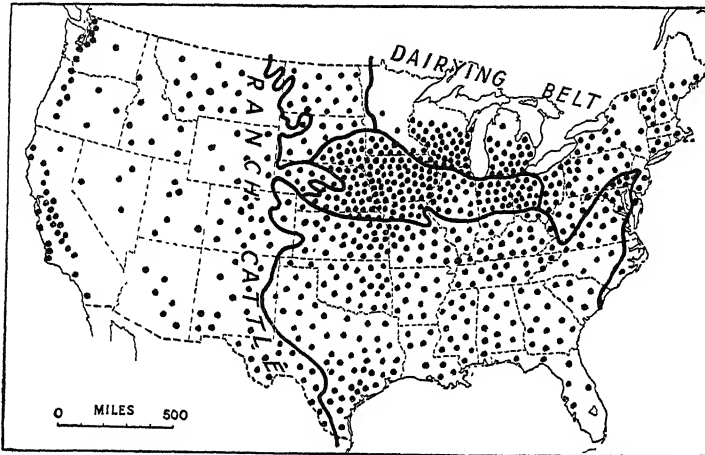


FIG. 40.—The distribution of cattle in the United States.
Each dot represents about 100,000 head.

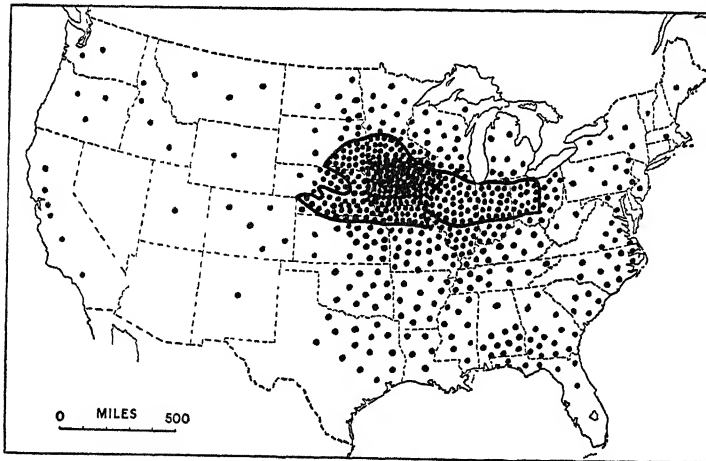


FIG. 41.—Distribution of pigs in the United States.

Pigs. Pigs are very important in United States farming economy. Half of them live in the Corn Belt, where they eat two-fifths of all the corn grown. Apart from the home consumption of pork, ham, bacon, and lard there is a large export of canned pig-meats, sausages, and lard.

Sheep. Whilst pig-meat is more used in the United States than in most countries, mutton and lamb are less used. Even so, the sheep population is high, thanks partly to the demand for wool. The sheep is largely the animal of the dry western plateaus, though numbers are found in the central states.

Horses. Every year with increased farm mechanization there are fewer horses and very few indeed are used in transport. Most that survive for farm use are in the deep south and other less accessible parts of the country.

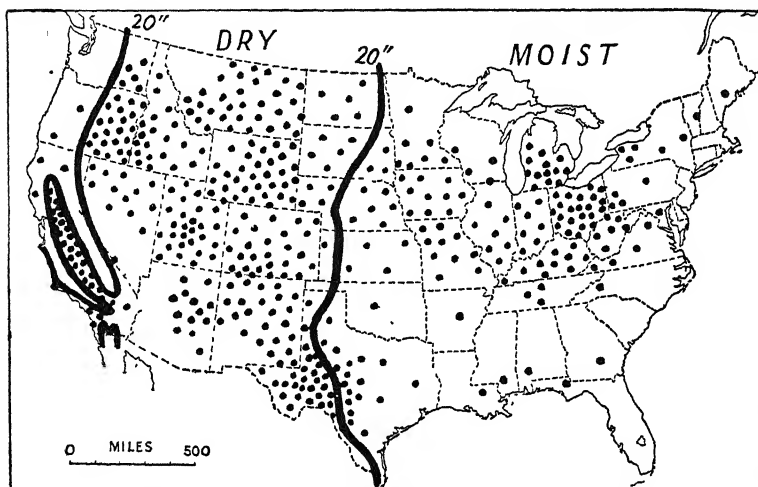


FIG. 42.—Distribution of sheep in the United States.

The total number has varied greatly in recent years. Each dot represents about 100,000 animals.

Fisheries. As in Canada, three main fishing areas may be distinguished.

The Pacific Fisheries. These are mainly important for the salmon of Alaska, Puget Sound, and the Columbia River but also for tuna and pilchard. Fish hatcheries now supply enormous numbers of small fish to make up the depleted natural fishing grounds.

The Atlantic Fisheries. Fishing for cod, mackerel, halibut, hake, and haddock is carried on in the cold waters of the open sea off New England. There is also inshore fishing for herring, flat fish, and shell fish. Crabs are famous in Chesapeake Bay, which is also celebrated for oysters, whilst lobsters come from the rocky shores of New England.

The Inland Fisheries. The most important are those of the Great Lakes, though they have declined in recent years. Many rivers are fished for white fish, trout, pickerel, etc. There are fresh-water clams in the upper Mississippi, but these are commercially

inferior to the marine clams of various sorts. Sport-fishing is very popular throughout the United States and good fishing streams or lakes attract thousands of visitors yearly.

Manufactures. Although the United States is easily the world's leading manufacturing country, the production of foodstuffs from farms and the output of the forests, mines, and fisheries is so huge that the country is not primarily dependent on the output of its factories in the same way as, for example, Britain and Belgium are. We may note some of the great groups of industries.

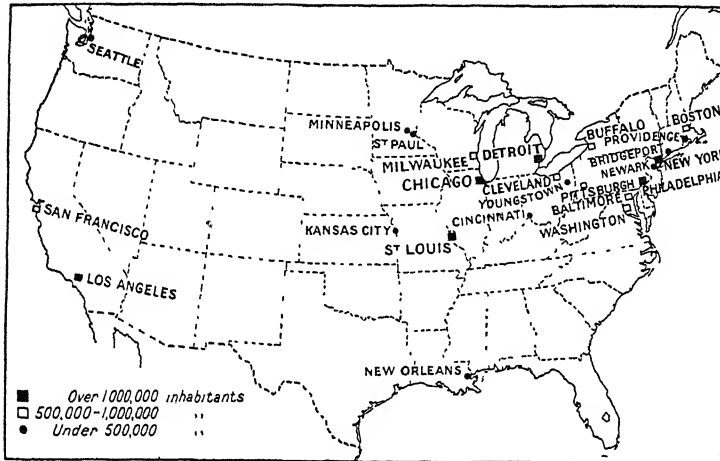


FIG. 43.—The chief manufacturing areas of the United States.

Food Industries. These are concerned with “processing” the products of home agriculture—such as meat-packing, making of sauces, pickles, fruit juices, and breakfast foods. People of the United States rely more on canned—and latterly frozen—foods than any other people in the world and many householders in towns get the bulk of their meat, vegetables, fruits, and beverages out of cans or frozen packages rather than fresh. The eastern seaboard towns tend naturally to deal with the processing of imported foodstuffs such as cocoa, chocolate, and chewing gum.

Textile Industries. Cotton spinning and weaving are still carried on in the old centres of New England where the mills were established by the early settlers from England and where formerly direct water-power was used. The mills now use coal or electricity, though the latter may be generated by imported coal. The newer centres of the industry are in the Cotton Belt itself—in numerous small towns of the Piedmont in the Carolinas and at Birmingham. Woollens, silk goods, rayon goods as well as the making of clothing tend also to

remain in the north-eastern states though nylon and rayon have largely replaced real silk.

The Iron and Steel Industry has already been discussed in Part I.

Shipbuilding has been a very fluctuating industry—enormously important in both the First and Second World Wars, relatively quiet during peace-time. In the Second World War the Pacific Coast ports such as Seattle and Oakland assumed a leading place and built hundreds of vessels from aircraft carriers to trawlers. The fastest, though not the largest, ocean liner (the *United States*, 52,000 tons) is a post-war product of the Atlantic Coast.

Machinery and Engineering are widely distributed.

Automobiles. The making of automobiles, of which the United States has more than the whole of the rest of the world combined, is concentrated in and around Detroit, but there are other centres in neighbouring states. It may be said that the industry has evolved from the former making of carriages and wagons from local hardwoods.

Railroad workshops are naturally widespread; the maintenance of a quarter of a million miles of track calls for large numbers of manufacturing and repair shops, employing very large numbers. The largest are located where steel is readily available, as in Jersey City, Chicago, and Buffalo.

Manufacturing Areas. It could be said in the years between the two World Wars that two-thirds of all the industrial works and workers were still to be found in the north-eastern states—between Milwaukee, Chicago, and St. Louis on the west and the Atlantic shores on the east. By 1939, however, both Los Angeles (with a great development of the movie industry, petroleum refining, aircraft and motor works) had come to occupy a high place and so had the San Francisco-Oakland area. Seattle and the Puget Sound area has also gone ahead rapidly. The leading industrial areas (rather than cities) include, roughly in order of value of output:

- (1) New York-Newark-Jersey City, with a very varied range.
- (2) Chicago with Gary—meat-packing and heavy industry and many others.
- (3) Detroit—motor vehicles.
- (4) Philadelphia with Camden—very varied.
- (5) Pittsburgh—iron and steel.
- (6) Boston—woollens, boots and shoes, leather.
- (7) Cleveland—heavy industry.
- (8) Los Angeles—wide range.
- (9) St. Louis—meat-packing, beer, machinery.
- (10) Buffalo—heavy industry, milling.
- (11) San Francisco-Oakland—wide range.
- (12) Baltimore—clothing, meat-packing.

- (13) Milwaukee—tractors, beer, leather.
- (14) Cincinnati—electrical gear, chemicals.
- (15) Bridgeport and the Connecticut Valley, Providence and Fall River—textiles and precision goods.
- (16) Youngstown—iron and steel.
- (17) Kansas City—flour-milling, food-processing.
- (18) Minneapolis—St. Paul—various, including milling.
- (19) The Texas cities of Houston, Dallas, and Fort Worth.

Transportation and Communications. In the early days of pioneer settlement river traffic on the Mississippi and its tributaries played a great part. Even so the river flowed from north to south, whereas the pioneers moved east to west and needed to send their produce to the east. Hence the great importance of the Erie Canal when it was opened in 1825 before there were any railways. Now the rivers are very little used and even the fine New York State Barge Canal which has replaced the Erie Canal carries only a small part of the traffic it could handle. The Great Lakes remain a highway of immense value and the St. Lawrence Seaway enables transocean liners and freighters to go direct to Chicago and Superior. Its effect on the ocean ports of New York and Boston is being watched.

There are 240,000 miles of railroad in the United States—more than in all Europe and a third of the world's total. There are large numbers of companies and the railways have to fight hard to keep both passengers and freight against increasing competition from buses, trucks, and private cars. Some branch lines have been closed, reducing the mileage of line operated from a peak of 264,000 to under 220,000.

More than 3 million miles of public roads exist and rapid improvement in their upkeep—concrete and oil-macadam or other all-weather surfaced roads now stretch right across the continent—has encouraged long-distance freight and passenger services as well as the enormous number of private automobiles. There are 1·7 million miles of surfaced road.

Oil and gas pipe-lines now play a special part in the transport of a substance in great demand. There is a network all over the country—many main lines are hundreds of miles in length. A good example is the pipe 24 inches in diameter running 1,388 miles from Long View, Texas, to Phoenixville, Pennsylvania, constructed in 1942–43 and continued by two branches to Philadelphia and to Bayonne, N.J. (on New York harbour).

Ports. Since the opening of the Panama Canal in 1914 the Pacific Coast ports of Los Angeles, San Francisco, and Seattle have steadily taken a large share in trade. As in all countries trade tends to concentrate in the large well-equipped ports and New York has 40 per cent. of the whole foreign trade. The other big Atlantic

ports are New Orleans, Galveston, Houston, Philadelphia, Boston, and Baltimore.

The foreign trade is enormous but, even so, small in comparison with the internal trade. There are some special features to be noted.

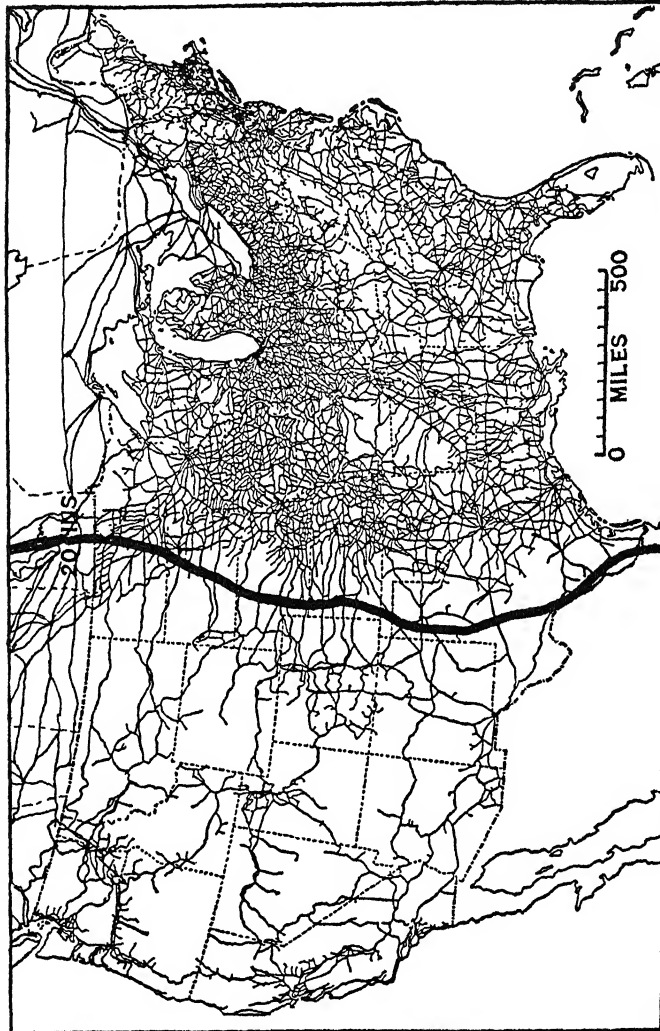


FIG. 44.—The railway network of the United States and Canada.
Showing its concentration in the more favoured areas.

Direction of Trade. It is world-wide—United States products go all over the world, though leading customers are normally Britain and Canada. No country supplies a very large proportion of the total imports, but Canada and Britain in normal times (*i.e.*

not including the Second World War and subsequent years) normally lead.

Exports include (a) raw materials and foods such as cotton, oil, tobacco, wheat, and meats; (b) manufactured goods of all sorts, but notably iron and steel manufactures and automobiles. The proportion of manufactured goods has steadily increased.

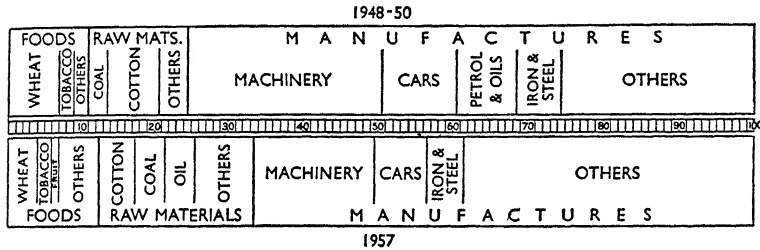


FIG. 45.—The exports of the United States.

Main items only.

Imports include (a) products of equatorial and tropical lands which cannot be produced at home—rubber, coffee, fibres, tea, spices, silk, cabinet woods; (b) manufactured goods of high grade, especially from Europe, such as china from Britain and watches from Switzerland; (c) minerals not produced at home such as tin and diamonds; (d) substances of which the home supply is becoming exhausted, notably wood and woodpulp.

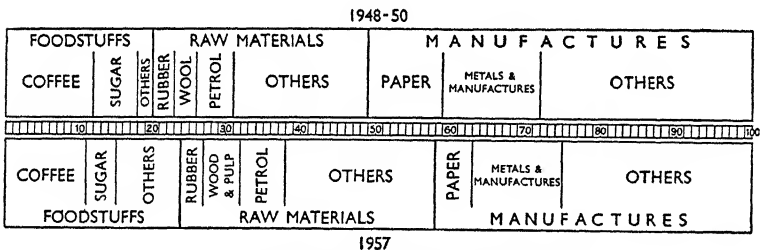


FIG. 46.—The imports of the United States.

THE GEOGRAPHICAL REGIONS OF THE UNITED STATES

NEW ENGLAND

The New England states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut form a distinctive unit occupying the north-eastern corner of the United States. The whole forms part of the Appalachian-Acadian mountain system—old folded mountains profoundly modified by long ages of erosion. The well-wooded sparsely populated uplands of Maine ("America's Vacationland") fade imperceptibly into similar country in New

Brunswick, whilst no change in country marks the passage from northern New Hampshire and Vermont to the Eastern Townships of Quebec. On the west, however, New England is sharply defined by the Hudson Valley and the valley occupied by Lake Champlain.

When the pioneer settlers from England arrived on the shores of New England in 1620 and subsequent years they found a somewhat rugged land, thickly clothed with forests of mixed deciduous and

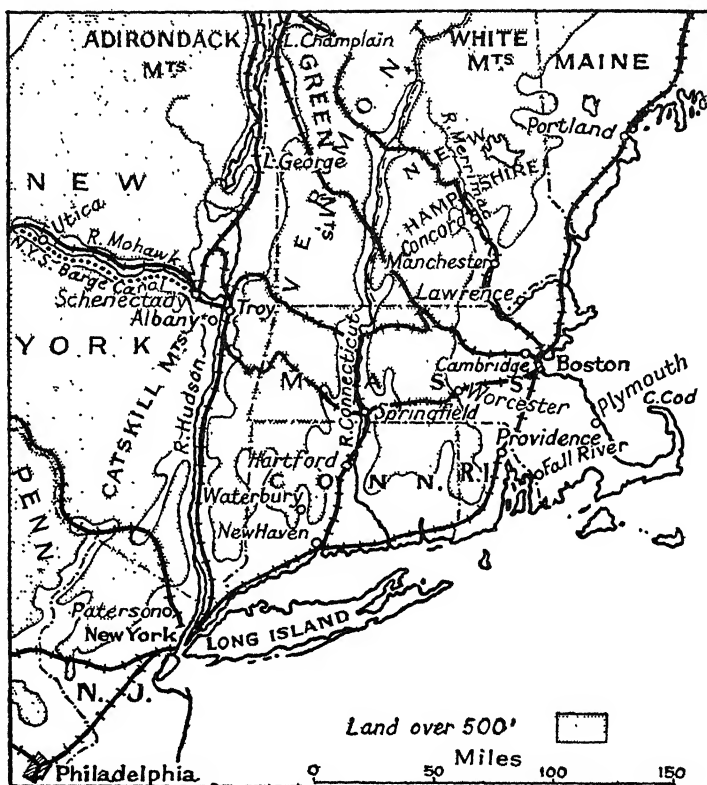


FIG. 47.—New England.

coniferous trees. They founded their first settlements such as Plymouth and Boston on the coast, but gradually they penetrated inland. They found the winters much more severe than those of their native land and the summers hotter; the land they so laboriously cleared often proved to be stony and infertile, so that their crops failed despite the well-distributed rainfall. To add to their troubles they were often hampered and attacked by hostile Indians. Gradually, however, they established over New England (excluding northern and western Maine) a settlement pattern of farmsteads,

villages, market towns, and ports or fishing villages closely resembling the pattern in old England. The settlers frequently named their new settlements after their home towns, they laid out their villages with a central "green" with a village church and community buildings after the Anglo-Saxon model in England. So New England became, and remains, the most "English" part of the United States. In the course of time much of the poorer farmland has been abandoned and the larger villages and towns have become concentrated in the lowlands and valleys—especially along the coast and on the broad fertile valley-floor of the Connecticut River.

The region has no coal and the early settlers took advantage of every little waterfall or swift stream which might afford motive power for their primitive mills. To-day hydro-electric power carries on the work. Despite an absence of most raw materials, manufacturing has persisted. Boston is the chief wool market of America, the woollen industry has centres at Lawrence, the cotton industry at Fall River, Providence, and elsewhere, boots and shoes are made in the towns around Boston, heavy machinery at Bridgeport, copper and brass and fine machinery (*e.g.* typewriters) in the towns of the Connecticut Valley such as Springfield (Mass.). The making of watches and clocks, jewellery, and other articles requiring little raw material persists in many small towns. Some towns are primarily business or commercial centres—thus Hartford handles a considerable proportion of America's insurance business. Apart from the vacation pursuits of shooting and fishing in Maine, there are many tourist attractions in the White Mountains of New Hampshire the Green Mountains of Vermont (the "Green Mountain State") and everywhere along the coasts—notably on the great sandy spit of Cape Cod. The Connecticut Valley has important tobacco fields and truck farms, but elsewhere farmers devote their attention to the supply of milk, fruit (especially apples), and vegetables to nearby urban markets. Many of the farmers are part-time or "hobby" farmers.

The focus of New England is the great city of Boston, the nearest of the large United States ports to Europe. Nearby at Cambridge is the famed Harvard University. Yale is situated at New Haven, Connecticut. The latter state extends to within a few miles of New York City, so that many who work in New York commute to their homes in the south-western parts of New England or at least have summer cottages to which they retreat from the summer heat of the city.

THE APPALACHIAN REGION AND THE MID-ATLANTIC REGION

The Appalachian Region may be considered to comprise the eastern highlands of the United States as far to the north-east as the Hudson River together with the coastal plain lying between the

uplands and the Atlantic Ocean. Broadly speaking the whole falls into a number of parallel strips (Fig. 50):

- (a) The Appalachian or Alleghany Plateaus on the north-west under which lie the great coalfields.
- (b) The Appalachian Ridge and Valley province (which includes the anthracite and other hard coal areas).
- (c) The Blue Ridge Mountains.
- (d) The Piedmont Plateau of ancient rocks.

Between the Appalachians and the sea lies.

- (e) The Coastal Plain or Mid-Atlantic Region.

The Coastal Plain is an area of recent emergence built up of recent sediments and traversed by sluggish rivers and deeply indented by their estuaries. The larger rivers are navigable as far inland as the edge of the Piedmont Plateau, where falls or rapids occur. In the early days of European settlement these rivers afforded means of penetration into the land and it was natural that towns should grow up where the falls necessitated a transference of goods from boat to land and where those same falls afforded motive power for mills. Thus there is a line of towns—the famous “Fall-line towns.” Towards the north where the coastal plain is narrower and the emergence of the land less or its subsequent “drowning” greater, ocean-going vessels were able to penetrate to the Fall-line towns and so Baltimore and Philadelphia have become great ports. Northwards the Coastal Plain becomes so narrow that it almost disappears at New York, where the heart of the city itself is sited on Manhattan Island (of the old rocks of the plateau region), whilst its suburbs stretch eastward on to Long Island which is part of the coastal plain.

The Fall-line towns owe much of their importance to their command of valleys which afford route-ways into the interior—route-ways followed by early trails and later by railways and roads. The more important of these rivers gaps are shown on Fig. 48. But by far the most important route-way into the heart of the continent is that afforded by the River Hudson and which has greatly helped the rise of America’s greatest port and greatest city—New York.

The Hudson-Mohawk Corridor and New York. The island of Manhattan is washed on its western side by the waters of the Hudson River, flowing in a deep, mile-wide, often cliff-bound trench. This magnificent waterway leads northwards 140 miles to Albany. There, by a succession of lowlands and the 180-miles-long Lake Champlain, is a natural low-level route to Montreal and the St. Lawrence, but of even greater significance is the valley of the Mohawk leading westwards from Albany to the Great Lakes. This Mohawk Corridor, 250 miles long, leapt into significance with the opening of the Erie Canal in 1825. For the first time settlers on the

rich lands beyond the Appalachians could send their produce cheaply and easily to the eastern seaboard and receive the manufactured goods they so greatly needed. Previously they had been forced to use the less direct Ohio-Mississippi route. To-day well over 2 million people live in the corridor with its succession of towns stretching from Buffalo on Lake Erie to Albany and Troy. *Buffalo* is a centre of heavy industry, with the iron and steel plant of Lackawanna near at hand, and a great port handling grain, oil, and timber. Because of the Niagara Falls it is the effective head of the Great Lakes navigation—from Buffalo vessels proceed easily westwards, whereas the passage to Lake Ontario involves the use of the Welland Canal.

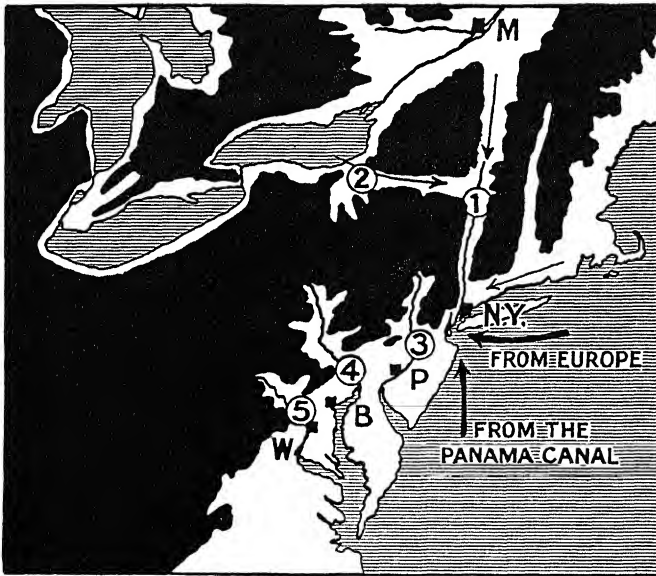


FIG. 48.—The regional position of New York.

The ports marked by letters and the river-routes marked by numbers should be identified

The old Erie Canal, only 4 feet deep and with 84 locks, fell gradually into disuse, but was replaced by the New York State Barge Canal (11 ft. 6 in. deep with 35 locks), built at a cost equal to half that of the Panama Canal during the First World War. But much more traffic is handled by the railways or road transport. Other important centres in the corridor include *Rochester*, *Syracuse*, *Utica*, and *Schenectady*.

New York City owes its pre-eminence amongst the cities of the world not to any one geographical factor but to the cumulative effect of many. It lies where the coastal plain has been almost entirely

"drowned" and a deep irregular inlet affords a large natural harbour adequately sheltered and with very deep water alongside firm ground. It faces Europe from which settlement and development came: it is far enough south to be free from ice. The small island of Manhattan, some two miles wide and a dozen miles long, is structurally a spur of the hard crystalline rocks of New England and affords a firm, strategic, and absolutely flood-free site between the deep channels of the Hudson River on the west and the East River on the east. Although the old rocks have made difficult and

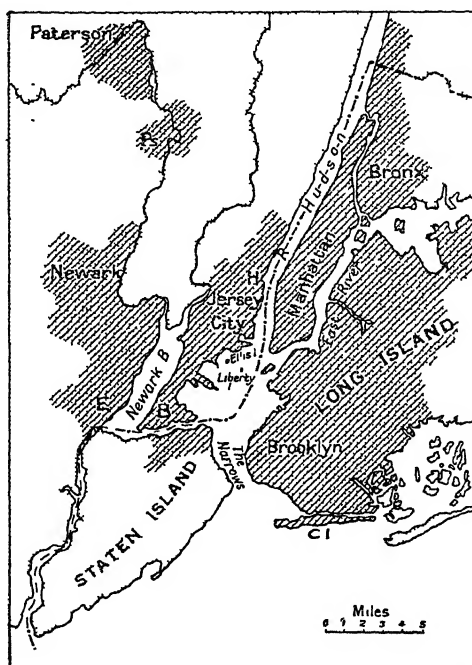


FIG. 49 —The site of New York.

The shaded areas are the closely settled parts. For explanation of letters see text.

expensive the construction of sewers, supply mains, and subways, they provide unrivalled foundations for the skyscrapers which have become inseparably associated with New York, and so, indirectly, with America in general. Manhattan could not expand laterally—it grew upwards. But at a later stage it proved possible to bridge and tunnel under both the Hudson River and the East River as well as to cross the narrower Harlem River to the north. The suburbs so connected (not those across the Hudson) were merged to form New York City in 1897. Connections by rail- and later by road-tunnel have been established also, but New York would not have

grown to be the perpetual rival of London (according to the area included each can claim to be the most populous city in the world) if it had not been for regional advantages: the access via the Hudson to a limitless hinterland and southwards along the coastal plain. New York lies near the junction of geographical regions with contrasted natural resources; on the north-east is New England with its early development of varied manufactures, to the south-west are the fertile Triassic lowlands which supply much truck produce to New York's markets, to the west the great coalfields.

Fur traders settled on Manhattan Island about 1615 and it was purchased from the Indians on behalf of the Dutch in 1626. The British took over the settlement of New Amsterdam in 1664 and renamed it New York in honour of James, Duke of York and Albany, brother of Charles II. For a short time, from 1784, New York was the capital of the United States. It then had 24,000 people and continued to grow rapidly, especially after the opening of the Erie Canal in 1825. By 1871 it had a million people. To-day it has over 8 million if one includes the closely connected towns of Newark and others on the New Jersey side of the Hudson, whilst no less than 12 million are counted in the retail trading area.

The Mid-Atlantic Coastal Plain. It is rather over 200 miles from New York to Washington and stretching between the two is the most remarkable line of great cities in the world. They lie at the head of sheltered estuaries which result from the "drowning" of the coastal plain and are thus ports as well as "Fall-line" towns. *Newark*, *Jersey City*, *Bayonne* (B. on Fig. 49), and *Elizabeth* (E. on Fig. 49) share New York's harbour and are really part of Greater New York, but they lie in the State of New Jersey. Along the waterfront are varied heavy industries—steel, chemical, engineering, oil-refining—elsewhere are factories concerned with electrical apparatus, and indeed the usual wide range associated with capital cities. Nearby *Paterson* is the premier silk town of the United States and *Passaic* (Ps. on Fig. 49) makes linen. *Trenton* has an important china industry, using both imported and American clays, but is no longer a significant port. *Philadelphia* (meaning the City of Brotherly Love) in Pennsylvania was founded by the English Quaker William Penn in 1682 and has become the fourth city of the United States in size. In its metropolitan area are the largest locomotive works in the world (Baldwins), shipbuilding and other heavy industries side by side with textile factories (for cotton, wool, silk, and carpets), and industries often associated with a great importing port—cigar-making, sugar-refining, and oil-refining. Its industries are shared by *Camden*, *Chester*, and *Wilmington*, all likewise on the Delaware.

A neck of land only a dozen miles across separates the head of Delaware Bay from the head of Chesapeake Bay, the drowned valley

of the lower Susquehanna River. On Chesapeake Bay is the near-million city of *Baltimore*. It too has many and varied industries, but an interesting development is the iron and steel works using Appalachian coal and imported iron ores. Being 150 miles from the ocean, Baltimore loses some of its trade to the "outports" of Hampton Roads, Newport News, and Norfolk.

President George Washington himself selected the site on the north bank of the Potomac, where tide water reaches the Fall-line,

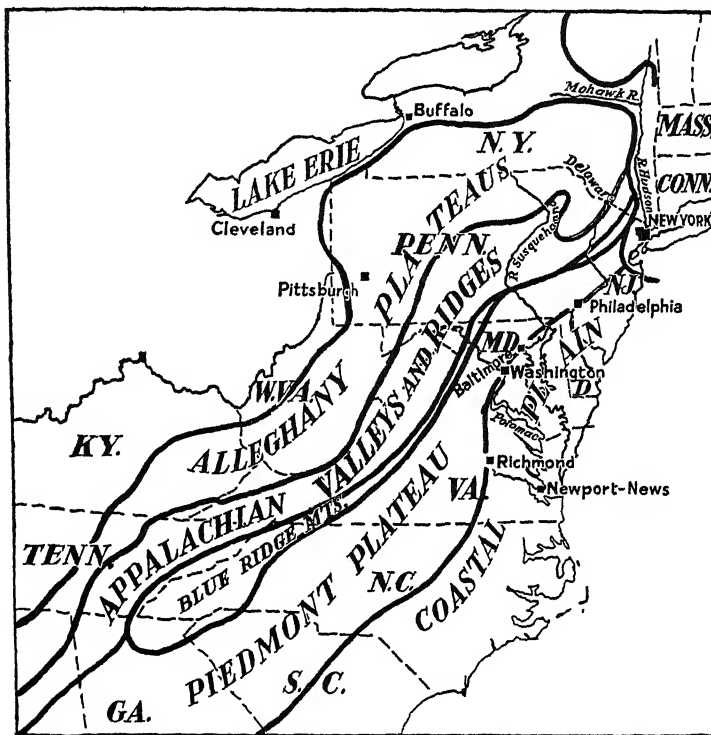


FIG. 50.—The Appalachians.

for his capital. Across the river about ten miles downstream is Mount Vernon, the home from which he visualized and planned the city to the point when he handed over the details to the Frenchman L'Enfant with the result that Washington has radiating streets and no skyscrapers.

The Atlantic coastline itself in the Mid-Atlantic Region is bordered by long sandy or shingle ridges known as "beaches," separated from the mainland by lagoons. Many resorts have grown up, the most notable being Atlantic City, where 70,000 residents cater for 10,000,000 visitors a year. Its board-walk promenade is five miles

long. It must be remembered that Long Island is simply a detached portion of the coastal plain and so Coney Island on Long Island—easily reached by New Yorkers via the subway system—is the most popular of many Long Island resorts (marked CI on Fig. 49).

Behind the coastal lagoons are often large stretches of barren sandy land with pine-trees. Homes of city dwellers (as on Long Island) may occupy much of such land, but the finer sands afford warm light soils suitable for the production of vegetables and fruit. Near at hand are 20,000,000 people ready to consume the produce of the truck farms; huge canneries at Baltimore and Camden handle still more of the produce. Some excellent soils are furnished by drained peat bogs, whilst warm red soils from rocks of Triassic age also occur. Different regions specialize in different crops—potatoes, beans, tomatoes, melons, onions, and strawberries all have their special localities. The light soils soon “warm up” in the spring, so the growing season may be over 230 days. Locally heavy soils support tobacco and dairy farms and many old mixed farms remain, as in New England.

The Piedmont Plateau. The Piedmont Plateau, which is literally the plateau at the foot of the mountains, was not covered by the ice sheets of the Great Ice Age and so was not swept bare of soil. It is largely thickly covered with sandy decomposed rock, deep and free from boulders, and occasional hills (monadnocks) rise from the surface. But the soil as a whole is not rich and the rolling upland has not encouraged close settlement and much remains clothed with poor woodland. Although the only town of any size actually on the plateau is Atlanta, there are many prosperous small towns.

The Blue Ridge Mountains. The Blue Ridge Mountains proper form a long, narrow, forested ridge for the most part over 3,000 feet high extending from North Carolina right across Virginia into Maryland and Pennsylvania. Each of the river gaps through the ridge is fully used by rail and road. Southwards the ridge broadens out into the Great Smoky Mountains and the Unakas.

The Appalachian Ridge and Valley Province. Running for over a thousand miles from the neighbourhood of Birmingham in Alabama to the St. Lawrence in the north is one of the most persistent and most striking relief features of the American Continent. It is the Great Valley which lies to the west of the older rocks of the Blue Ridge Mountains or New England. The Great Valley itself is the easternmost of a whole succession of valleys separated by long narrow sandstone ridges and hence “Ridge and Valley Province” is used as a descriptive name for the whole. The valley or valleys are usually excavated along outcrops of limestone or various “weak” strata, contrasted with the sandstone of the ridges. Though the main valley is a continuous feature, it is occupied in different parts by many different rivers—by part of the Hudson in the north, then by

various tributaries of the Delaware, Susquehanna, Potomac, and Tennessee Rivers. It has different local names: it is the Lebanon Valley in Pennsylvania, the Cumberland Valley in Maryland, the Shenandoah Valley in Virginia, and part of the Tennessee Valley in Tennessee. The valley floors usually have fertile soils, but there are great contrasts in the development of different parts.

In the *north* of the province, in Pennsylvania, the Blue Ridge Mountains have died out and settlers penetrated easily from the coastlands. They found good magnetite iron ores in forested country and an iron industry using charcoal was firmly established by the end of the eighteenth century. Later anthracite replaced charcoal and, though the focus of the iron industry shifted west to Pittsburgh and the Lakeside towns, important works remain at Reading, Altoona (railway works), Scranton, and Harrisburg, often in narrow inconvenient valleys.

In the *centre* are relatively isolated but beautiful valleys where such features as the Natural Bridge (of limestone) attract tourists but which are devoted mainly to mixed farming.

In the *south* is the upper part of the valley of the Tennessee and its tributaries. Once forested with hardwoods, this region was until recently one of remarkable isolation and remoteness. Clearing the forest gave farmland of only moderate quality and particularly liable to soil erosion. Farmers, mainly white though with some negro, managed to exist with a very low standard of living, whilst the vast quantities of rain water, flowing uninterruptedly off the eroded lands, caused diastrophic floods in the lower part of the river basin and in the Mississippi itself. United States Congress was led therefore to set up the Tennessee Valley Authority (which started work in 1933) to control the river water by constructing dams both for flood control and generation of electric power, to check soil erosion, educate farmers, and raise the level of home life, and also to develop resources of all sorts and establish industries. The area controlled by the T.V.A. is over 40,000 square miles and this experiment in large-scale land-planning and development has been an object lesson to the world. The first dam to be constructed was the Norris Dam, near which a new town of the same name was built. Knoxville and Chattanooga are the two centres in this part of the Ridge and Valley Province.

Still farther south, where the Appalachians give place to the plain, is *Birmingham*, with an iron industry based on local ores, coal, and limestone, and a cotton industry which, with that of the various small towns of the Carolinas and Georgia, is a very serious competitor of that of New England.

The Appalachian Plateaus. The plateaus which lie on the western or inland side of the Appalachian mountains—of the Ridge and Valley Province—are quite different from the Piedmont Plateaus on

the east. They are built up of horizontal or gently folded sediments and the main part of the plateau in Pennsylvania, Ohio, and West Virginia (the Alleghany Plateau) coincides almost in extent with the greatest coalfield in the world—the Appalachian Coalfield.

In the *north* the plateaus extend almost to the Erie and Ontario Lakeside. In the north-east they have been dissected to form the Catskill Mountains of New York State; farther west broad north-south valleys were widened by tongues of ice and are now occupied by the famous finger lakes and bordering these are some good farmlands. There are some small manufacturing towns such as Binghamton (boots and shoes), Elmira, and Ithaca (the seat of Cornell University).

The main part of the plateau, presenting a 2,000-feet “front” to the east, was originally covered by a fine deciduous forest and settlers penetrated by the deep, narrow river valleys. When cleared, the plateau proved to have indifferent soils and to be cold and bleak, so that there is much abandoned farmland. Activity is centred on mining. Almost in the geometrical centre of the plateau, where the Alleghany and Monongahela Rivers join to form the Ohio, stands the great iron and steel metropolis of *Pittsburgh*. Other towns which share in the industry include Youngstown, Wheeling, and Johnstown. Subsidiary industries include glassworks, china works, chemicals, and cement, whilst Connellsville is famous for its coke. The coal seams, thick and easily worked, crop out along the sides of many of the valleys. The early workings (as in Britain and other parts of Europe) picked out the “eyes” and have rendered comprehensive large-scale operations difficult, so that the large collieries are in the “newer” parts of the field. But there are vast areas virtually untouched. Natural gas is also widely available.

In the *south* the plateau narrows and in Kentucky and Tennessee is usually known as the Cumberland Plateau. The coalfield extends here also, but is difficult of access and little worked. The Kentucky “mountaineers” of this area represent some of the most backward and primitive people living in the United States to-day.

THE ATLANTIC COASTAL PLAIN

We have already considered the Atlantic coastlands as far south as Washington as the Mid-Atlantic Region. At Washington a marked change takes place. There “The South” begins. Though less clearly defined physically, “The South” has an individuality as distinctive as that of New England. The differences are due in the main to the history of settlement. Although the South has come to mean the thirteen states (Virginia, the Carolinas, Georgia, Florida, Alabama, Tennessee, Kentucky, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas) lying south of the Ohio River, the original

southern states are those of the Atlantic border from Virginia to Florida.

South of Washington lies the State of Virginia, named in honour of the virgin Queen Elizabeth of England and founded by or for impoverished English noblemen who tried to restore their family fortunes by developing tobacco plantations. It is still a country of large estates with imposing country mansions in contrast to Pennsylvania which is a land of small farms and scattered farmsteads. The South includes the whole of the Cotton Belt and is almost synonymous with it except that Virginia and Kentucky lie north of it and Florida to the south. Thus Virginian plantations have always been concerned with tobacco, not with cotton. The coastal belt of Virginia now forms part of the Mid-Atlantic trucking region famous for tomatoes.

The three south Atlantic states of North Carolina, South Carolina, and Georgia extend from the Atlantic to the Blue Ridge and thus include parts of the Coastal Plain, the Piedmont Plateau, and the Mountains. The principal settlements are still found in two lines, (a) the Fall-line and (b) the Coastal Ports.

Despite the importance of the Fall-line, the rolling sandy-surfaced Piedmont Plateau fades gradually into the coastal plain of horizontal Cretaceous and Tertiary sediments with deep loose soils. After river valleys had been formed a subsidence took place which enabled the sea to invade the valleys, but this, as already described, was much greater and more marked in the north. In the south Atlantic states the coastal plain comprises:

- (a) a coastal strip with extensive marshes, lagoons, and sand bars,
- (b) a fertile inland belt devoted to agriculture except where the soil is too sandy.

Along the coasts the tidal currents are insufficient to sweep away mud brought down by the rivers and off-shore islands of mud, usually covered by sea sand, have been built up. These "sea-islands" were famous for the finest cotton the world produces—sea-island cotton. Georgia still has a considerable production. The once-important rice cultivation along the coast has almost disappeared and fishing is of little significance. There are stretches of deserted farmland and though locally tomatoes, strawberries, early potatoes, and other vegetables are cultivated, the coastlands have not their old importance.

The inland belt was once the heart of the Cotton Belt, but has never fully recovered from the ravages of the boll-weevil and the Civil War. The great days of this part of the Cotton Belt and the old world ports of Charleston (South Carolina) and Savannah (Georgia) were when slavers brought their human cargoes from

Africa and cotton planters built stately mansions on their estates or town houses in the ports.

The cotton lands extended on to the Piedmont and, though cultivation is less intensive than formerly, there has been a growth of cotton ginning and spinning on the spot with the aid of hydro-electric power. Mills and mill towns are comparatively small: much of the labour is supplied by a class of "poor white." Another industry is the making of cigarettes—especially in small cities near the tobacco-growing areas shown in Fig. 38, such as Richmond and Winston-Salem.

FLORIDA

The State of Florida consists of a peninsula—essentially part of the Atlantic Coastal Plain—stretching 400 miles southwards, together with a strip of the Gulf coastlands 200 miles from east to west and 50 miles wide. Four-fifths lies less than 100 feet above sea-level and there are vast stretches of dull, monotonous scenery. The Atlantic coasts have the same coastal marshes, lagoons, and sand bars as farther north; inland are huge cut-over sandy areas once occupied by long-leaf pine forests interrupted by cypress swamp forests. The vast wooded marshlands and swamps of the Everglades alone cover 6,000 square miles.

The climate of Florida has many advantages. It may be that the Appalachians funnel cold air towards the west and certainly the proximity of the Gulf Stream helps to counteract the chilling effect of cold air masses from the north, whilst the tip of the peninsula is only $1\frac{1}{2}$ degrees from the Tropic. In this extreme south freezing temperatures have never been recorded and are reached elsewhere only on three or four days a year. From December to February inclusive the average temperature is around 55° or 60° F.; in summer the thermometer has never recorded 100° F. but stays between 70° and 90° F. Only 24 hours by rail from New York, it is not surprising the Florida Coast has become a winter resort and playground. There are small select resorts such as Palm Beach or larger ones such as Miami with skyscraper hotels. In the extreme south a long line of coral "keys" is linked by a road along a viaduct a hundred miles long which has replaced a former railway.

Only a few areas have soils good enough for agricultural development. There the wealth comes from citrus fruits (oranges and grapefruit) or locally tomatoes, strawberries, melons, and potatoes. The chief area is around Tampa in the west and this region also produces four-fifths of the United States home production of phosphate for fertilizer. This greatly assists local production, but much is shipped from Tampa. The whole lies south of the Cotton Belt.

Florida was a Spanish possession till 1819 and the Spaniards founded St. Augustine in 1565, so it is the oldest European settlement

in the United States. The port of Jacksonville is the "key" to the peninsula.

THE ADIRONDACKS

In two places the ancient rocks of the Canadian Shield are found south of the Canadian border. One is in the isolated mountain mass of the Adirondacks in New York State. With numerous lakes and streams, varied forest land, but little farming, this is a summer playground for camping and fishing, a winter playground for skating and skiing. A leading resort centre is Lake Placid.

THE UPPER LAKES REGION

The other and larger area of Canadian Shield country lies round the western end of Lake Superior. So strong is the influence of structure and relief on human occupation that the contrast with the fertile farmlands to the south and west is at once obvious. The relief is more varied than in neighbouring parts of Canada because of the long ridges which rise from the surface. The fact that this is the most important iron-ore producing area in the world has been responsible for the development of progressive mining towns such as Virginia and ports such as Two Harbors, as well as providing much of the reason for the development of Duluth and Superior. Once well timbered, the forests have all been cut over and only second growth timber of little value now exists. The drift-free ancient rocks yield but little soil, so that farms are few and poor, devoted to mixed farming or dairying with hay as the chief crop. Appropriately the region is often called the Mining-and-Lumber or, with reference to present-day conditions, the Mining-and-Cutover lands. Details of the mineral industries have already been given.

THE INTERIOR LOWLANDS

The Interior Lowlands of the United States, lying between the Appalachian Plateaus on the east and the Great Plains on the west, were once differentiated into an eastern forested half (with hardwood forests) and a western grassland half (with the rich, tall grass prairies). But the natural vegetation has been so completely removed that the interior lowlands are differentiated more easily on a basis of dominant agriculture. Some of the chief factors involved are shown in Fig. 51.

The Spring Wheat Belt. No geographical feature exists to mark the boundary between the United States and Canada. The fertile black soil of the level plain which was once the bed of Lake Agassiz—the Red River Plain—stretches south from Winnipeg, Manitoba, into north-western Minnesota and the north-eastern part of North Dakota. It is magnificent spring wheat land with cold winters, a

warm wet growing season, followed by a hot dry harvest time. Westward lies the loess land of the second prairie level in North Dakota and then the drier conditions associated with the third prairie level with its sunken valleys. To the south-east of the region—actually beyond its limits—where the Minnesota River joins the Mississippi are the twin cities of Minneapolis and St. Paul, at the old head of navigation on the Mississippi where power from the Falls of St. Anthony could be used. Minneapolis is pre-eminent as a flour-milling centre.



FIG. 51.—The Interior Lowlands of the United States.

Identify the cities marked by letters. They are all mentioned in the text.
The lowland area lightly stippled is that covered by drift deposits, including loess.

The Dairying Region. The State of Wisconsin, "America's Dairyland," lying between the upper Mississippi and Lake Michigan, has a varied relief including large "driftless area" in the south-west. Eastwards are large stretches of sandy drumlin country and moraines separated by lake-filled hollows. The whole lies north of the Corn Belt and the farms which occupy the most favoured parts in a varied and well-wooded landscape support herds of Holstein and other dairy cattle. Some villages are devoted entirely to cheese-making, other areas to milk for Chicago which lies to the south. In the heart of dairying Wisconsin lies the attractive state capital and university city of Madison with its four lakes; on the shores of Lake Michigan is Milwaukee with its huge breweries, flour mills, and leather works.

Drift-covered country with numerous moraines forms the greater part of the State of Michigan between Lakes Michigan and Huron and this too is dairying country; it is also noted for its sheep. Although such manufacturing towns as Grand Rapids (furniture), South Bend, Kalamazoo, Battle Creek, and Toledo (just to the south, across the Ohio State line on Lake Erie) lie, except the first, on railways east from Chicago, the great metropolis is Detroit on the Detroit River, which connects Lakes Huron and Erie—broadening in the centre to form Lake St. Clair. *Detroit*, the fifth city of the United States, is the world's greatest automobile manufacturing centre, associated especially with Ford and General Motors. Some of this industry is shared with Windsor, Ontario, which faces Detroit across the narrow river. All these manufacturing towns owe their existence to transport facilities rather than to resources of the region. It may be argued that Detroit with local hardwood supplies made carriages and out of this has grown the automobile industry, but there are many other factors. More important to-day is its accessibility to cheap and speedy lines of communication, and to great and wealthy markets.

Along the eastern shores of Lake Michigan are conditions comparable to those along Lake Erie, where the climate is rendered milder by the large body of water, and fruits, including grapes, are grown commercially.

The Corn Belt. This region, nearly a quarter of a million square miles in area, is perhaps the finest block of farming land in the world. Most of the surface is covered by a fine-grained deep glacial loam affording a soil of unrivalled physical qualities in depth, texture, and moisture conditions. This drift is derived from material swept southwards by the great ice sheets, but being far from outcrops of hard rock large stones and boulders are rare. The surface of the land is gently undulating and so ideal from the farmer's point of view. The natural vegetation was hardwood forest in the east passing to rich, tall grass prairie in the west. Though the natural vegetation has disappeared the humus in the soil remains and over much of the Corn Belt the glacial loess has become rich black chernozem. The Corn Belt is occupied by an endless succession of farms with rich fields of corn, soya beans, oats, alfalfa, hay and wheat. Over half the grain acreage is corn and the crops are so arranged as to secure a well-distributed labour programme throughout the year. But 85 per cent. of the corn never leaves the farms and the real objective of the Corn Belt farmer is the fattening of cattle and hogs, with some sheep, for the slaughterhouses and meat-canning factories. Range cattle are brought in from the west and south—notably Herefords—and when fat are sent to the stockyards. The greatest of all the collecting centres is Chicago, but there are large stockyards and meat plants at such places as Sioux Falls (South Dakota),

Sioux City (Iowa), Omaha (Nebraska), Kansas City, Indianapolis and through Illinois, Iowa, and Ohio. The area was settled from the east, so that many of the towns in the east grew up at river crossings or where settlers drew supplies—as Columbus (Ohio) and Indianapolis (Indiana). Though there are often thus geographical reasons for some of the early settlements it should be noted that there are frequently other reasons for their growth. Thus Indianapolis was deliberately chosen as state capital because of its central position.

To the west—in the heart of Nebraska—the Corn Belt passes into drier range country and to the south-west gives places to the Winter Wheat Belt. Here, in addition to winter wheat, sorghums and alfalfa are grown. Rich coalfields are located in many parts of the belt, notably in Illinois, Iowa, and Missouri. In Indiana, Illinois, and Oklahoma there are also important oilfields.



FIG. 52.—The site of Chicago.

P—the old portage between Lake Michigan and River Illinois

Chicago, the second city of the United States, has grown with amazing rapidity. At the south-western corner of Lake Michigan, it was located where only a very few miles separated a sheltered creek of Lake Michigan from navigable waters draining into the Mississippi. This route served the early explorers and Indians as a natural portage. Here the Great Lakes reach the heart of the Corn Belt, so that the basic reasons for the growth of Chicago are obvious. Cheap water transport with nearby coal supplies assured the development of heavy industry including iron and steel both at Chicago and neighbouring lakeside towns, such as the incredible Gary (not founded till 1906 by the United States Steel Corporation), and a natural further development has been that of the varied

industries associated with a great metropolis and the greatest railway centre of America.

To the south of the Corn Belt *St. Louis* occupies a focal position just below the junction of the Missouri and Mississippi Rivers. It is on the west bank, but many of the eastern railway systems have their marshalling yards and terminal freight stations in East *St. Louis*, east of the river. *St. Louis* developed early as the gateway to the west—the starting point for the Oregon trail to the north-west and for trails to California.

The Ohio Valley. The Ohio Valley or Basin may be considered a separate region because it lies south of the Corn Belt; much of it is broken, even rugged, country where there is no drift cover. Quantities of corn and hogs are raised, but tobacco is generally the farmer's best money crop. The early pioneers used water transport as far as they could—this is often forgotten now—and so *Cincinnati* on the north bank of the Ohio made both boats and carriages for them and later received both meat and grain from them. Lower down the river *Louisville*, founded at the Falls of Ohio, is the river port for the rich blue grass region of Kentucky, long famed for its horses, *Evansville* is close to coal and was early a crossing place of the river. In the part of the basin lying in southern Indiana are famous quarries for limestone used all over the continent.

The Ozark-Ouachita Highlands. This island of old rocks rising from the central plains repeats many of the features of the Appalachians except that the structure is east-west. The Ozark Plateau in the north is like the Appalachian plateaus; it is an isolated region of poor soils like the Cumberland Plateau of Kentucky. It overlooks by a high edge the Arkansas valley which is like the Great Valley, whilst the Ouachita Mountains consist of many ridges like the Ridge and Valley Province. There are rich metalliferous mineral deposits (mainly lead-zinc) at Joplin. Just off the massif are the great oil-fields to the south in Arkansas, but particularly to the west in Oklahoma and Kansas. Corn is the chief crop, but farming methods are much more primitive than in the Corn Belt. Many of the farmers still lead an isolated, practically self-sufficient life. However, times are changing and the general level of living is now higher than it was ten to twenty years ago.

The Cotton Belt. South of the latitude of the Ozark-Ouachita highlands the Central Lowlands pass into the Gulf Coast Plains. These plains are like those of the Atlantic Coast in that they consist of sands and clays elevated from the ocean floor. Sometimes there are harder layers which give rise to ridges with northward-facing scarp slopes. Between these ridges and the Appalachians in Alabama lies the famous Black Belt of Alabama (marked 2 on Fig. 39), so called because of its rich, dark, calcareous soils. A similar belt, the Black Waxy, occurs in Texas (marked 1 on Fig. 39)

and in it are to be found the chief towns of Texas—San Antonio, Austin, Fort Worth, and Dallas.

The recently uplifted Gulf Coast Plains are cut into two sections by the broad flood plains of the Mississippi. The great river swings from side to side and the alluvial soils are fertile and well cultivated—especially in the sections called the Yazoo Basin (or Yazoo Bottom) and St. Francis Basin. Settlements on the flood plain are liable to inundation and so the main towns are on bluffs overlooking the river where it swings close to higher ground. Memphis (Tenn.), Vicksburg (Mississippi), and Baton Rouge (Louisiana) are good examples.

The country above the flood plain *east* of the Mississippi is the old heart of the Cotton Belt. It includes most of the State of Mississippi, northern Alabama, and eastern Tennessee. Much of it has remained rural and non-industrial; there are few large towns and the whole has more negroes than whites. Old plantation mansions, many in ruins, may be seen, but it is now a country of small farms with more than one-third of the crop acreage under cotton. The other chief crops are corn and sweet potatoes, but many and varied animals are kept.

In the Yazoo Bottom cotton may cover 85 per cent. of the farmland and negroes reach 90 per cent. of the population. This is the country which has been called the “deepest south.” The St. Francis basin is nearer the northern limit of the Cotton Belt and so a greater variety of crops (including much corn) is grown.

West of the Mississippi, the development is later—especially since Texas joined the United States in 1845. The great cotton area is located on the Black Prairie already mentioned, but cotton cultivation has been extended westwards on to the Edwards Plateau, which is really part of the Great Plains. There are more white cotton farmers in Texas and the cotton is marketed through Houston. But Texas has minerals—in 1937 the state became the leading oil producer and in that year produced a quarter of all the oil obtained in the world. Since that date it has retained its premier position.

From the economic point of view there are some who would claim that Southern California has become an outlying section of the Cotton Belt—cotton is actually one of California’s most valuable crops.

The Gulf Coast Margin and the Mississippi Delta. South of the Cotton Belt is a strip of country where the effect of the sea is felt on the climate. The thermometer drops to freezing (32° F.) on only a few days in the year and very high summer temperatures are unknown, but the high humidity and rainfall do not favour cotton. So this is the Sub-Tropical Coastal Belt, with sugar-cane, rice, and various other sub-tropical crops.

The coast is fringed by sandspits and there are large lagoons,

swamps, and marshes behind them. The ports are on shallow harbours which need to be dredged. In the east are Pensacola (Florida) and Mobile (Alabama); in the west are Houston (Texas) on a lagoon and Galveston on a sandspit. These are cotton ports, but there are also specialized oil ports with pipe-lines to the oilfields. Along the Mexican border is an important irrigated area using the water of the Rio Grande to produce grapefruit, vegetables, and tomatoes as well as cotton.

Much of the Mississippi delta is still a waste of salt marshes and swamp forests sparsely inhabited by Acadians, the descendants of French settlers, who still speak a French patois and have their centre at Lafayette. Very different is *New Orleans* with its skyscrapers and half-million people. New Orleans was founded by the French in 1718 on the northern side of the main Mississippi, but was held by the Spaniards from 1762 until acquired by the United States in 1803. Most of the people were at that time of French or Spanish descent—properly called Creoles. New Orleans flourished with the development of the south and of the Mississippi as a great highway. Though the river is no longer of major importance as a route-way, New Orleans has developed an extensive South American and Pacific Ocean trade with the opening of the Panama Canal. The difficulties of sewerage and water supply, so long a danger to health, have been overcome. Nearby the fertile cultivated region known as the “sugar-bowl” produces a fifth of all the sugar used in the States. At the “head” of the delta and at the limit of ocean navigation for large freighters stands the more modern state capital of Louisiana, Baton Rouge.

THE GREAT PLAINS

This is the name given to the elevated plains between the foot of the Rockies on the west and the fertile interior plains or lowlands on the east. The rainfall is between 10 and 20 inches a year, so that this is a semi-arid region of brown and dark brown soils, formerly clothed with short grass prairie. It is a zone of constant struggle between man and Nature: in years of good rainfall cropping is both possible and profitable, but in years of poor rainfall crops fail. Many have tried to raise crops in the Great Plains but without much success. Deserted farmsteads are a common sight in some areas and provide proof that the “pioneer fringe” has receded, leaving the Great Plains a ranching area.

Underlying the monotonously level plains are almost horizontal sediments. A few major rivers rise in the Rockies and make their way across the Plains in broad trenched valleys. The chief rivers are the Missouri, Platte, Arkansas, Canadian, and Red, and in the past their valleys provided the main route-ways for stage-coaches to the west. They are also used by some of the railways, so that the

traveller seeing the tree-lined river courses often fails to appreciate the vast treeless plains lying beyond the valleys. Because the rivers run in these trenched valleys only narrow strips of irrigation are possible.

In the north the eastern edge of the Plains is marked by a scarp called the Missouri Coteau. In the western part of South Dakota the monotony is interrupted by the granite dome of the Black Hills. The Missouri Plateau not only stretches to the foot of the Rockies but is extended into the heart of the mountains by two basins—the Wyoming or Green River Basin (which allowed an easy route for the Oregon Trail and later the Union Pacific Railway) and the smaller Bighorn Basin.

Farther south the Great Plains are more varied and stand at two levels. Large stretches may be covered by drifted sand as in the Sand Hills of Nebraska; in other places the horizontal beds have been worn into steep-sided masses or “bad-lands,” as on the border of South Dakota and Nebraska. In Nebraska a depression known as Goshen Hole separates the Sand Hill Region from the Rockies and farther south is the larger Colorado Basin in a similar position, whilst in New Mexico the broad Pecos Valley lies between the Great Plains and the Rockies.

In Texas the Great Plains extend through the extraordinarily flat Llano Estacado or Staked Plains into the Edwards Plateau with its high edge (the Balcones escarpment) affording a drop of nearly 2,000 feet to the Gulf Coast Plains.

For the most part the Great Plains form a country of large ranches, sending cattle to Corn Belt farms for fattening. There are some dry farming areas (primarily for wheat) and some patches of irrigation (mainly for winter forage) along the rivers, whilst in the east farmers have tried to push crop farming (including cotton) as far on to the Plains as possible.

Naturally there are few towns on the Great Plains themselves. There is a long line of towns hugging the foot of the Rockies—Pueblo, Colorado Springs, Denver, and Cheyenne—but on the east the settlements are down on the lowlands where they receive ranch cattle, as at Sioux Falls, Sioux City, Omaha, Kansas City, Fort Worth, Dallas, and Austin.

THE ROCKIES

Although this name has occasionally been applied to the whole complex of mountains and plateaus which occupies the western third of the United States, it should be restricted to the main chain of folded and block mountains between the Great Plains on the east and the Intermontane Plateaus on the west.

In the north the succession of north-south ranges with deep valleys so well seen in Canada is continued southwards into Montana.

Here we find Glacier National Park, where some of the mountains are sufficiently high in this northern latitude to have glaciers.

Southwards the Rockies broaden out into an irregular tangle of mountains and valleys with much fine scenery but only a few scattered mining settlements, including such celebrated ones as Butte. Some of the finest country is included in Yellowstone National Park with its famous geysers and hot springs, but other noted mountains are the Bighorn Mountains to the east, the Tetons to the south. In Utah the north-south Wasatch Range provides irrigation water for

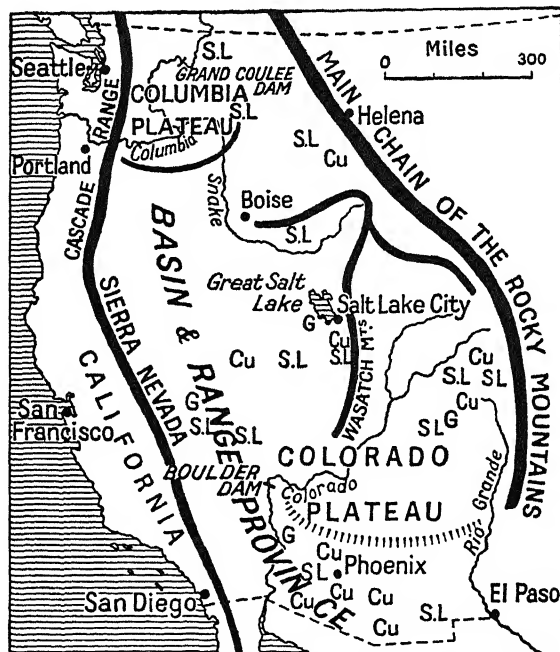


FIG. 53.—The Rocky Mountain Plateaus.

G=gold; Cu=copper; S.L.=silver-lead

the Mormon settlements of the state. Away from the irrigated lands settlements are few and far between and consist mainly of mining centres. Still important are Butte (copper) and Great Falls (copper).

The irregular disposition of the ranges of the Northern Rockies of the United States prevents their being a serious barrier to communications. Most of the mountains are forested, but the valleys and basins are arid (with only 5 to 10 inches of rain). Owing to the elevation and northerly situation the growing season is short, so that irrigation is less profitable than farther south.

The broad Wyoming Basin separates a northern from a southern

group of the Rocky Mountains. The southern group is narrower but the ranges more continuous, thus forming a more serious barrier. Indeed, only one railway (now with an alternative route through the Moffat Tunnel) makes its way across this barrier by the difficult and spectacular Royal Gorge of the Arkansas River. Amongst the peaks in this southern section several, including Pike's Peak, exceed 14,000 feet. The mountains, however, die out before reaching the Mexican border and the famous southern Santa Fé trail (succeeded by the Santa Fé railway) went round the southern end through Albuquerque. Settlement in the southern Rockies is mainly restricted to the mountain valleys, especially that of the upper Rio Grande. The northern part of this valley is known as the San Luis Valley in Colorado—100 miles long and 50 miles wide and floored by alluvium, but there are many similar though smaller valleys.

THE INTERMONTANE PLATEAUS

The Columbia-Snake Plateau. South of the Canadian border and between the northern Rockies on the east and the Cascade Ranges on the west is a great plateau occupying a basin in Washington, Oregon, and Idaho. The Columbia River has a long course in Canada and, after receiving the drainage from the Arrow and Kootenay Lakes, drains southwards across the border and over this great plateau before being joined by the Snake and turning west to cut through the Cascade Range. Originally the floor of the basin must have been interrupted by hills, mountains, and valleys, but in comparatively late geological time it was flooded again and again by great outpourings of very fluid basalt lavas. These now form horizontal sheets, in places several thousand feet thick, covering no less than 250,000 square miles and burying all but the highest mountains. The last stages in the eruption were marked by the formation of volcanic cones.

The plateau has an average elevation of over 1,000 feet, but in places the lava beds have been broken by faults and the blocks tilted. Whilst the Columbia itself has cut a deep trench, the middle course of the Snake is through a spectacular canyon 4,000 to 6,000 feet deep and 125 miles long—almost as grand as the Colorado Canyon. During the Great Ice Age a tongue of ice pushed its way down the Okanagan Valley parallel to the Cascades and forced the Columbia to cut a deep gorge to the east—200 miles long, 400 feet deep. This it later abandoned, leaving a gorge dry except for a string of lakes and known as the Grand Coulee. A dam has been built across this and the Grand Coulee converted into a reservoir designed to irrigate 1,200,000 acres and to generate nearly 3,000,000 horsepower. The rainfall over the basin is generally low, as the Cascades cut off the rain-bearing winds, so irrigation is generally necessary. Often, however, the volcanic soils are rich and in the higher eastern parts

around Spokane and Pullman rolling deposits of loess afford ideal wheat country known as the Palouse. Here some 10 per cent. of the wheat of the United States is grown, as well as much barley. Spokane has hydro-electric power and a little to the east is the silver-zinc-lead mining centre of Cœur d'Alène.

Where rain-bearing winds penetrate by the Columbia Gorge through the Cascades are found the fruit orchards of Walla Walla. Farther north the Yakima, Wenatchee, and Okanagan valleys are famous for their irrigated apple orchards, but where land cannot be irrigated grain-growing is pushed into the drier parts of the plateau by various "dry-farming" methods.

The Basin and Range Province. This region is well named because it consists of isolated ranges separated from one another by basins. The ranges are of the block-mountain type—blocks of the earth's crust separated by great faults and then tilted so that the upstanding edges form mountains. The mountains have been greatly worn down and their denudation has provided the material which fills the basins. The whole region is dry and covers the entire State of Nevada, with western Utah, whilst similar country occurs over much of southern California, Arizona, and New Mexico. After the Great Ice Age some huge lakes were left which have gradually dried up, leaving silt flats and salt plains. The Great Salt Lake of Utah is the very shallow remaining part of the former Lake Bonneville, and Pyramid Lake in western Nevada represents the remaining part of the glacial Lake Lahontan. Provided they are not impregnated with salt, the glacial lake silts are very fertile when irrigated. The Basin and Range Province was long known as the Great Basin, or the Great American Desert, and little was known of it when Joseph Smith in 1849, having led his Mormon followers across a thousand miles of mountain and plateau, visualized the possibilities of using the streams from the Wasatch Mountains to irrigate the desert. So came the establishment of that fertile stretch, the "Garden of Allah" with Logan, Ogden, Salt Lake City, and Provo. This "Oasis" has a long frost-free period and on its half-million acres are fruit orchards, vineyards, wheat, sugar-beet, barley, and vegetable fields. In their journeys across the continent the Mormons lost many of their menfolk in fights with the Indians, and so when they determined to settle the land the farms were often left in charge of the women and each man had several wives—in separate homes. This system of polygamy ceased entirely in 1896, but the majority of the people of Utah are still Mormons.

Away from the irrigated land, huge tracts are used for the grazing of cattle and sheep, though in the driest parts little use can be made of the land. The old rocks of the ranges are often rich in minerals: Nevada is still called the "Silver State"; Utah has the largest open-pit copper mine in North America (at Bingham) and is also a notable

producer of lead, gold, and zinc. Use is also made of the salt deposits.

The dry clear atmosphere is pleasant at most seasons of the year. Aided by liberal gambling and divorce laws this has encouraged the development of resort towns—notably Reno, Carson City, and Las Vegas in Nevada; even so that whole state of 110,000 square miles has less than 300,000 people.

The Colorado Plateau. To the south of the Basin and Range Province is a huge plateau area where the underlying ancient rocks are thickly covered by almost horizontal sediments. Uplift of the whole in late geological times has resulted in the already existing rivers cutting enormously deep canyons. The most famous of these is the Grand Canyon of the Colorado River in Arizona—the “Copper State,” or “Grand Canyon State,” where the trench is a mile deep but only 6 miles wide at the top. The canyon is a great barrier—for 1,400 miles there is only one railway crossing of the river and only two roads. One of the road crossings (Lee’s Ferry) is essentially for tourist traffic, the other is at Boulder Dam. This great dam, one of the highest in the world, has impounded the river waters to form a great reservoir generating power for southern California and supplying water for irrigation. Naturally the Colorado Plateau itself is not suitable for irrigation, being so high above river level. Rainfall is enough to support some forest growth on the upland. Sheep and cattle manage to find sustenance on the scrublands, but the carrying power of the land is very low, with the result that most of the ranches are very large—often 20,000 to 100,000 acres. Lava fields cover some of the surface and form particularly barren country in a sparsely populated land.

Southwards the plateau may be said to end at the Mogollon Mesa in Arizona, beyond which the country is more of the Range and Basin type. Here there are some irrigation settlements and a little dry farming (in southern Arizona and southern New Mexico), with active experimental work at such centres as the university town of Tucson (Arizona). The three chief irrigated areas are (1) the Salt Lake River and Gila Valleys, Arizona; (2) the Yuma (Arizona) area; (3) the Imperial Valley (partly in the extreme south of California, partly in Mexico).

Although this is the hottest and driest part of North America its soils yield very well when water is available; the advantages include a growing season lasting nearly the whole year. Only occasionally are frosts a source of anxiety to the farmer. Five to seven crops of alfalfa can be cut each year, long staple cotton, citrus fruits, winter vegetables can all be grown and command high prices. The 500,000 acres irrigated in the Imperial Valley have been increased to 2,000,000 by the Boulder Dam project. Even dates can be grown in these hot desert lands.

THE PACIFIC NORTH-WEST

The Pacific North-West is the name generally applied to the western parts of the states of Washington and Oregon. Running parallel to the Pacific Coasts of the United States are two great chains of mountains, separated by a succession of valleys. The Coast Ranges comprise the fine mass of mountains culminating in Mt.



FIG. 54.—The Pacific North-West.

Olympus (7,915 feet) in Washington, separated from the Coast Ranges of Oregon by the broad estuary of the great Columbia River. Between Vancouver Island and the Olympus Mountains is the Strait of Juan de Fuca, leading to the drowned section of the valley where are found the great north-western port of Seattle and its lesser neighbours, Tacoma and Olympia. Farther south, in Oregon, the

valley is occupied by the Willamette, a tributary of the Columbia and on which, a little above the junction, is Portland.

The magnificent Cascade Range rises for the most part to between 4,000 and 5,000 feet and is well timbered, but has a whole series of wonderful snow-capped extinct volcanoes, rising to over 10,000 feet. In the south the knot of mountains known as the Siskiyou and Klamath Mountains unites the Coast Range and the Cascades and culminates in Mt. Shasta (14,162 feet). In addition to these great volcanic peaks, there is the remarkable Crater Lake beneath the shadow of Mt. Thielsen (9,180 feet) and numerous lava-covered areas. The Cascade Chain is breached in one place—by the great gorge of the Columbia River—and full use is made of this breach by both rail and road.

The Pacific North-West enjoys an equable climate—mild winters and relatively cool summers—like that of the neighbouring parts of British Columbia or like that of north-west Europe. The rainfall is well distributed through the year, though with a winter maximum. It varies greatly in total amount, so that dry or sheltered valleys alternate with exposed rainy mountains. There is relatively little settlement on the exposed Pacific Coast, but the Cowlitz and Willamette valleys have apple and other fruit orchards and small fruit and dairy and mixed farms which supply the needs of towns and lumber camps. Actually only 1 per cent. of the area is in crops, 2 per cent. in grass, the remainder being forested. The wealth is mainly in lumber and timber products—a little in fisheries. Nearly half the rapidly disappearing lumber reserves (notably Douglas fir and Western yellow pine) of the United States are located in this region.

CALIFORNIA

Although the State of California is in no sense a geographical region, it comprises a number of very distinctive units. It consists essentially of:

- (a) the Coast Ranges, breached about the centre by the narrow Golden Gate or entrance to San Francisco harbour;
- (b) the Great Valley, drained by the Sacramento in the north, the San Joaquin in the south;
- (c) the lofty snow-capped Sierra Nevada;
- (d) the Basins and Ranges of southern California.

The *Sierra Nevada* is like one of the ranges of the Basin and Range Province on a huge scale—it is a gigantic block of country with a steep face to the east and a longer slope to the west. Trenched by spectacular valleys, including the Yosemite, it has many magnificent peaks, including Mt. Whitney (14,496 feet) and Mt. Lyell (13,000 feet).

The *Great Valley* is a semi-arid basin filled with great quantities of alluvial gravels, sands, and silts, sometimes 2,000 feet thick. The valley thus comprises (a) broad flood plains with numerous channels, (b) alluvial fans where streams from the mountains disgorge their loads, and (c) sand dune areas.

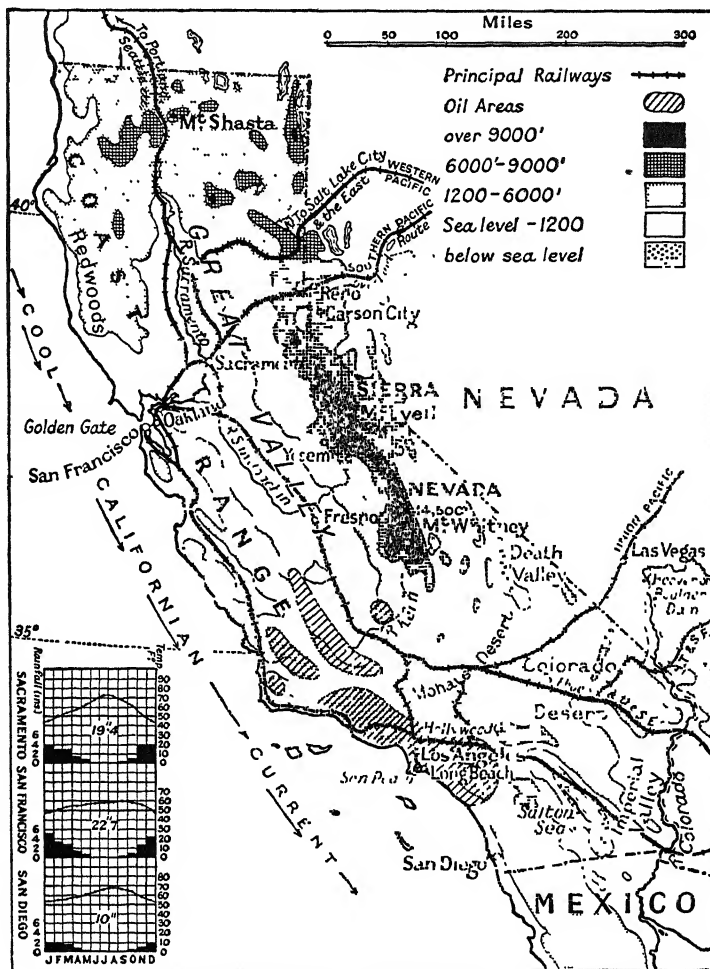


FIG. 55.—California.

The *Coast Ranges* are not continuous. A succession of ridges with intervening valleys runs obliquely to the coast and earth movements have not quite ceased in the earthquake zone.

Climatically most of California enjoys a winter-rain or Mediterranean climate. The Coastal Ranges get a heavy rainfall, especially

in the north, where the Redwood forests can boast the world's largest trees and the oldest living things on the earth's surface. Most of the Great Valley is so dry that irrigation is essential; the range of temperature is greater, so that there is a spring frost danger which greatly worries the orange growers of the south. The Sierra Nevada has again a good rainfall with fine mountain forests. The Salton Sea and its valley region is practically desert; Death Valley is completely so.

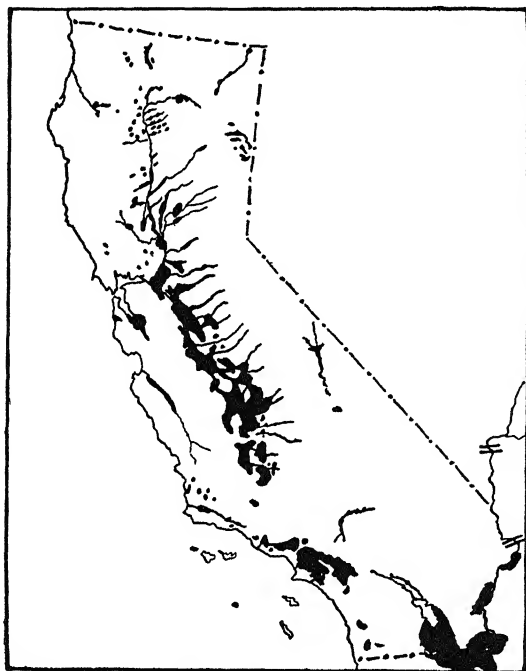


FIG. 56.—The irrigated land of California.

The settlement and development of California falls into four stages:

(a) The Spanish period, when missionaries from Mexico penetrated as far north as San Francisco (notice the names of Californian towns) and established churches and missions.

(b) The Mining period. The growing interest of the remainder of the United States in California was suddenly intensified by the discovery of gold in the western foothill belt of the Sierra Nevada in 1848 and one of the greatest gold rushes of all times—that of 1849. A few made fortunes, but more remained to develop the land.

(c) The Agricultural period. This has been marked by the

steady development of irrigation farming, but especially by the great citrus fruit growing industry of the south. Fresno claims to be the "raisin capital" of the world, and other towns are concerned with other agricultural products.

(d) The Agricultural-Industrial period. A succession of wonder oilfields in the south led to a phenomenal development of oil-mining and so to the great growth of Los Angeles. The dry sunny climate helped the film industry in its early stages and Hollywood, a part of Los Angeles, became established as the world's premier film-city. Climatic conditions over much of the United States are hard, so that not only do people seek to retire

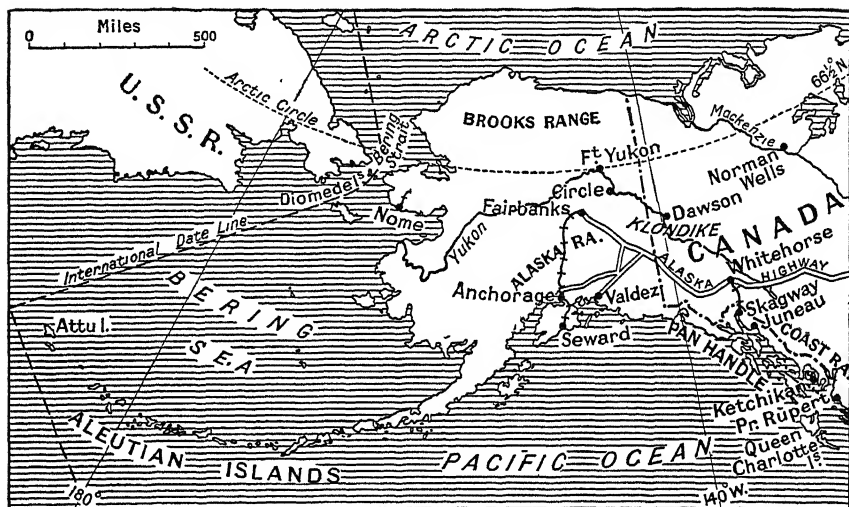


FIG. 57.—Alaska.

and enjoy the climate of California in their later years, but many industries appreciate conditions where outdoor work can be carried on throughout the year. Further, the opening of the Panama Canal in 1914 and increasing trans-Pacific trade encouraged the growth of Los Angeles and San Francisco's port activities, leaving Sacramento to serve, in addition to its functions as state capital, the agricultural central valley.

ALASKA

This vast territory of 584,400 square miles was purchased by the United States from Russia in 1867 for \$7,200,000. At that time there were many who criticized this waste of public money, buying "an icebox," but 80 years later the *annual* value of Alaskan produce was more than ten times the purchase price.

Alaska is still a land of the future, and has less than 150,000 people. The native peoples are the Eskimo in the north, the Aleuts of the Aleutian Islands, and various tribes of American Indians in the south-east and coastal regions. In 1890 there were only 4,000 white people in the country; then came the discovery of gold in the Yukon (Canada) and the gold rush of 1898 through the port of Skagway, so that by 1900 Alaska had 36,000. A steadier development of mining and timber-working followed—many white people settled in the “Pan-handle.” After the First World War the Government assisted farmer settlers in the Matanuska Valley, or the “bread basket” of Alaska, and during the Second World War many troops got to know Alaska as a jumping-off place for Japan. In the narrow Bering Strait between Alaska and Russia there are two islands only 3 miles apart: one is American, the other Russian. It is small wonder that Alaska has great strategic importance and that U.S. Army engineers constructed during the Second World War the Alaska Highway, from Edmonton (Alberta) via Whitehorse (Yukon) to Fairbanks, in the heart of Alaska, with branches to the coast.

Alaska may be divided into five main regions:

South-eastern Alaska, or the *Panhandle*, is the fiorded, forested coastland along the Pacific, extending inland to the crest of the Coast Range. It has fishing, timber-working, and mining towns, including the capital and port of Juneau, the fishing centre of Ketchikan, and the port of Skagway. Its beautiful scenery, including glaciers, attracts many summer tourists, who travel by comfortable steamers through the sheltered “Inland Passage.”

South Central and Interior Alaska. From the port of Seward on the forested coast a railway and motor road run through the modern airport town of Anchorage, through the Matanuska Valley (with a climate not unlike northern Minnesota and suitable for farming of a hay and dairying type), across mountain ranges to the interior at Fairbanks (where there is a university).

The Alaska Peninsula and Aleutian Islands are cold, damp, and foggy.

The Western Coastlands and Lower Yukon have mining settlements, such as Nome, but the tundra lands are ice-bound most of the year.

Arctic Alaska, or the slopes to the Arctic, is the home of the Eskimo. The formerly important whaling has declined and reindeer were introduced to help maintain the life of the Eskimo population.

MEXICO

Mexico is a large republic, with an area of about 760,000 square miles, and a population of twenty-six millions. Mexico was a colony of Spain from 1521 to 1822, and most of the inhabitants are

descended from Spanish settlers and from the native American Indians.

Mexico consists of a broad high plateau, a continuation of the Western Plateaus of the United States, with a narrow coastal plain on either side. On the west is the long mountainous peninsula of Lower California, in the south-east is the lowland peninsula of Yucatan. The Tropic of Cancer runs right through Mexico, so the coastal plains are hot and enjoy a good rainfall. The slopes of the plateau are cooler, but attract a good rainfall. But the surface of the plateau is 4,000 to 8,000 feet above sea-level and sheltered from the influence of the sea. The days are hot and the nights cold; there is a great difference between summer and winter. The plateau gets particularly hot when the sun is overhead and a small monsoon is caused, bringing rain from east and west in the summer. Lower California is in the desert belt and remains dry.

The Tropical Coastlands are suitable for cane-sugar, rubber, vanilla, and tobacco, and in settled times good crops are obtained. Sisal hemp comes from Yucatan.

The Temperate Hill Slopes produce good coffee and large quantities of maize, which is the staple food of the people. Where the rainfall is poor, small tracts are irrigated.

The Plateau usually suffers from poor rainfall, and irrigation is usually needed for cotton, wheat, and maize. Many sheep and cattle are reared. The bulk of the people live on the southern part around Mexico City.

Mexico is famous for its mineral wealth. It produces nearly a third of the world's silver and huge quantities of copper, lead and zinc. There are also deposits of iron and coal. These minerals come from the plateau, especially near *Mexico City*. On the flanks of the mountains are the famous oilfields which were first worked about 1910. But Mexico produces now less than 2 per cent. of the world's supply. *Tampico* is the main oil port. Mexico has not yet developed many industries. Hydro-electric power is available, and cotton goods are made at *Vera Cruz*. Mexico City is the largest city, capital of the republic, and near the important silver-mining regions.

CENTRAL AMERICA

Central America consists of the six small republics of Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, and Panama, with the British Colony of Honduras. A broad backbone of mountains runs through the countries; it narrows gradually to a single chain in the Isthmus of Panama. There is a narrow coastal plain on either side of the mountains. The rainfall on the Atlantic side, being derived from the Trade Winds, is heavier than on the west. As in Mexico, it is possible to distinguish:

- (a) Tropical plains, producing sugar, bananas, coconuts, and hard timbers.
- (b) Temperate hill slopes, producing coffee.
- (c) Cool grass-covered highlands.

As in Mexico, the inhabitants are of Spanish-Indian descent.

The Republic of Panama occupies the narrowest part of the isthmus between North and South America. Many years ago the

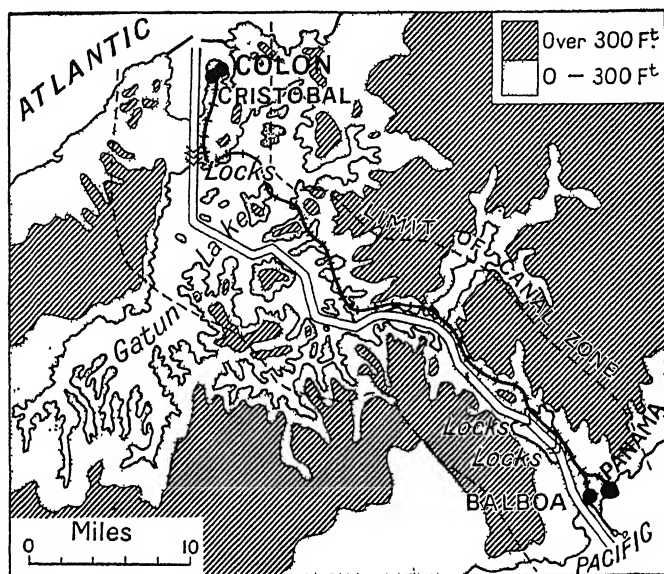


FIG. 58.—The Panama Canal.

Notice the hilly nature of the Isthmus, the irregular course of the canal from the north-west to south-east and the three locks at each end. Though the canal is 36 miles from coast to coast it is 50 miles from deep water to deep water.

Frenchman (De Lesseps) who built the Suez Canal tried to construct a canal across the Isthmus of Panama, but he failed. In 1904 the United States purchased a strip of land ten miles wide from Panama and spent \$500,000,000 in building the Panama Canal. The canal was finished in 1914. The canal belongs to the United States, but it may be used by vessels of all nations on equal terms. Every year 4,000 to 6,000 ocean steamers go through the canal, mostly American and British. The canal is about 36 miles long, but for more than half the distance it runs through an artificial lake. The Panama Canal was much more difficult to construct than the Suez. The Suez Canal passes through flat land, but the Panama Canal has to cross a ridge of hills. This it does by means of locks. The town at the northern or Atlantic end is *Colon*: at the southern or Pacific end is *Panama*.

The Panama Canal is of great importance to the United States because it allows ships to ply between her west coast ports and her east coast ports, and the whole American fleet could quickly be transferred from the Atlantic to the Pacific Ocean or *vice versa*. Notice, too, how it facilitates trade between the busy manufacturing states round New York, and the South American countries of Chile and Peru. The canal affords Australia and New Zealand an alternative route to Europe which is now largely used.

THE WEST INDIES

The West Indies consist of four large islands and a large number of small ones. Nearly the whole of the group lies within the Tropics.

Cuba is a large Spanish-speaking republic. Cuba produces one-third of the world's supply of cane-sugar. The sugar is exported largely to the United States and Europe. Cuba is also famous for its tobacco, exported from the capital and principal port of Havana.

Puerto Rico is a much smaller island, belonging to the U.S.A., and again sugar-cane and tobacco are the leading products—together with some coffee.

Haiti (or Hispaniola) is divided between two Negro republics—French-speaking Haiti and the Spanish-speaking Dominican Republic. The Negroes are the descendants of liberated African slaves. Both republics are very undeveloped.

Jamaica, part of the British West Indies, is famous for its cane-sugar, tobacco, and bananas, which are exported through the ports of Kingston, Montego Bay, and Port Antonio.

The smaller islands of the West Indies, known as the "Lesser Antilles," belong mostly to the British Empire, though some are French. They nearly all produce cane-sugar, some limes, and sea-island cotton. The British island of Trinidad really belongs geographically to South America and produces large quantities of mineral oil and pitch. The pitch is obtained from the famous "pitch lake," and it is valued for "tarring" metalled roads. Although only about the size of Lancashire, Trinidad produces over 20,000,000 barrels of oil annually.

EXERCISES

1. A Census of nearly all countries in the British Empire is taken every ten years, the next being due in 1961. Keep up to date the population table for Canada from the *Canada Year Book*, or *Statesman's Year Book*.

2. Forest Products of Canada. The latest information will be found in the *Canada Year Book*.

3. Agriculture in Canada. The Tables should be completed from the *Canada Year Book*. A figure corresponding to Fig. 17 is published annually and care should be taken to notice important changes.

4. The Foreign Trade of Canada. Figs. 19 to 21 should be kept up to date from the *Canada Year Book* or the short summary published annually.
5. The next Census of the United States will be in 1960. Complete table from the *Statesman's Year Book*.
6. Agriculture in United States. Keep the tables up to date from the *International Year Book of Agricultural Statistics*.
7. The Foreign Trade of the United States. Figs. 45 to 46 should be completed from the *Statesman's Year Book*.

EXAMINATION QUESTIONS

1. Name the parts of Canada which produce wheat for export, and discuss in detail the favouring conditions.
2. Give an account of the iron and steel industry of the U.S.A.
3. Give a general geographical account of the cotton lands of the U.S.A.
4. Draw a map of *either* the Appalachian *or* the Cordilleran mountain systems of North America, bringing out clearly the important barriers and passage-ways.
5. Show from the *Canada Year Book* statistics in what lines manufacturing development has been greatest in Eastern Canada since 1900.
6. Discuss the connection between the railways of Canada and the distribution of the population.
7. "For her forests alone Canada is an invaluable asset of the Empire." Comment on this statement.
8. Estimate the capacity of Canada to furnish for export food products other than wheat.
9. Describe the climate of the Canadian prairies and its control of human life and activities.
10. Give an account of the sources and use of hydro-electric power in the eastern provinces of Canada.
11. *Either*, Write a concise geographical account of Newfoundland, and compare it summarily with Vancouver Island.
Or, Compare the highland areas of eastern and western Canada.
12. Describe Canada's position with regard to the world's lumber reserves. From your discussion, what legislation would you recommend?
13. Trace the history of the dairy industry in Canada, showing clearly the important factors in its development.
14. What do you predict as to the general tendencies of Canada's export trade in the immediate future?
15. Discuss the position of Canada in relation to the world's food supply.
16. Discuss the economic prospects of the so-called Barren Grounds and the northern archipelago of Canada.
17. Write a geographical account of the Lake Peninsula of Ontario.
18. Estimate the importance of the distribution of the water-power resources of Canada for the industrial development of the country.
19. Good natural harbours are plentiful on the coasts of Canada, but ports with considerable trade are few. Explain the reasons.
20. Examine, concisely, the geographical factors affecting the development of trade in the Gulf ports of U.S.A.
21. Summarize the economic geography of the Sacramento Valley (Cal.).
22. Discuss, in relation to temperate North America, the part played by water-routes in determining the location and growth of great towns.
23. Write a brief essay on "The Mineral Wealth of the United States of North America."
24. Give an explanatory account of the distribution of forests in Canada.
25. Analyze the location of the chief centres of iron and steel manufacturing industries in the United States.
26. Outline the physical features common to West Indian islands; illustrating your answer by reference to particular islands or groups.
27. Divide into natural regions that part of Canada which lies *east* of the Rocky Mountains, and point out the chief contrasts in the economic development of these regions.
28. Compare and contrast the position, trade, and industry of San Francisco with those of any typical eastern port of the United States.

29. Supposing the American Cordillera to be divisible into four parts, (*a*) north of Mexico, (*b*) between southern U.S.A. and the Knot of Pasto (Ecuador), (*c*) between the Knot of Pasto and southern Chile, and (*d*) the extreme south, describe the outstanding relief features that distinguish each of these from the others.

30. Discuss the division of the prairie land of North America into natural regions.

31. Compare and contrast the climates *either* of Nova Scotia and Southern British Columbia, *or* of California and Florida, giving indications of relations of climate to vegetation for each of the regions you select.

32. Discuss *either* the mineral resources of the Dominion of Canada, *or* the economic possibilities of Central America.

CHAPTER II

SOUTH AMERICA

Position and Size. South America has an area of about 7,000,000 square miles, or roughly the same as the United States and Canada combined. Notice that the equator passes through the mouth of its greatest river, the River Amazon. The Tropic of Capricorn passes roughly through the middle of the continent, but the whole continent is wedge-shaped so that more than two-thirds of its area is within the tropics—which accounts for its being of less importance than North America. Note carefully the position of longitude 60° W. as being

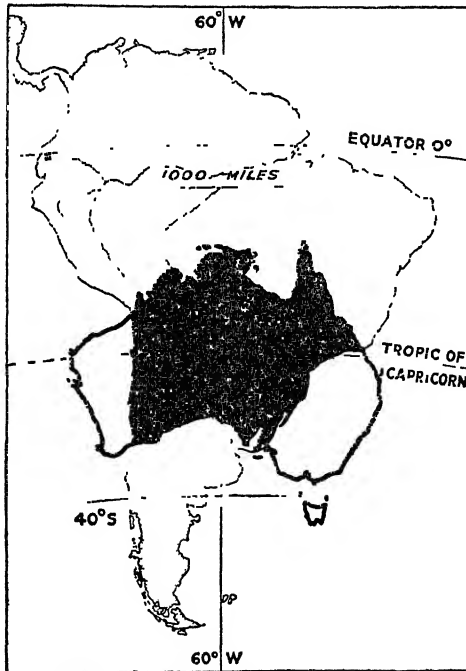


FIG. 59.—The position and size of South America.

Australia is placed in the same position relative to the Tropic of Capricorn.

a central meridian for the continent. South America is almost an island, being joined to North America by the narrow Isthmus of Panama, which has, indeed, been cut through by the Panama Canal.

Physical Features. Notice that South America has few indenta-

tions in its coast. With the exception of Africa, it has the least length of coast-line for its size of all the continents. Study Fig. 60 and see how South America falls into a few well-defined physical units, remarkably like those of North America. These units are:

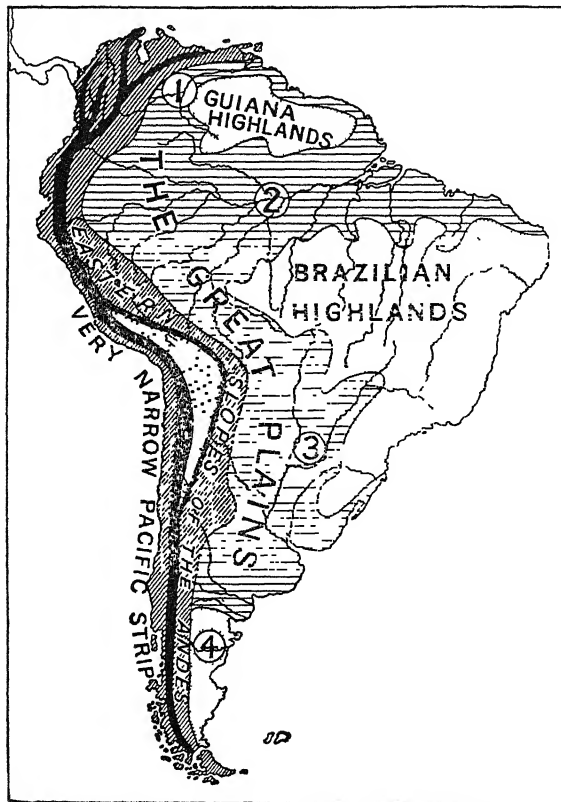


FIG. 60.—The main physical features of South America.

1=The basin of the Orinoco; 2=The basin of the Amazon; 3=The basin of the Paraná and Paraguay Rivers; 4=The Argentine Pampas and the Patagonian Desert. Compare the structure of North America. Notice that Patagonia is a plateau, not a lowland.

- (1) The narrow coastal strip bordering the Pacific Ocean.
- (2) The great fold ranges of the Andes—broad in the north and consisting of several ranges with plateaus in between, but narrowing to one main range in the south.
- (3) The central plains.
- (4) The eastern highlands—formed of two plateaus of old, hard, crystalline rocks, separated by the Amazon River. The two plateaus are the Guiana Highlands in the north, and the Highlands of Eastern Brazil in the south.

In reality the Central Plains comprise four areas from north to south:

- (a) The basin of the Orinoco (the Llanos, or grassy plains).
- (b) The great basin of the Amazon (the Selvas, or Equatorial Forests).
- (c) The basin of the Paraná-Paraguay Rivers.
- (d) The Argentine Pampas and the Patagonian Desert, the latter a plateau, not a lowland.

Rivers. There are four important river systems in South America, one corresponding to each of the first three divisions of the Central Plains, and a fourth system—that of the Cauca and Magdalena—draining the northern ranges of the Andes.

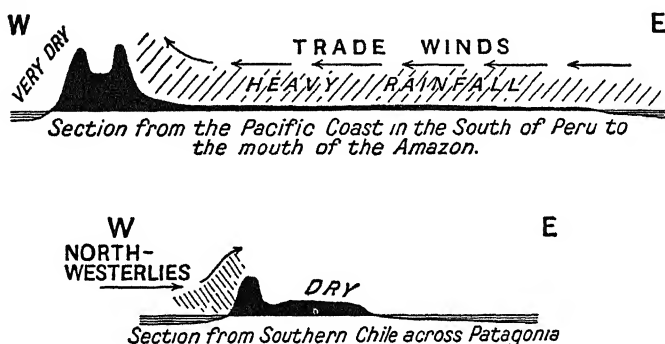


FIG. 61.—Sections across South America from west to east.

Geology and Minerals. As we have learnt to expect, metallic minerals are associated with the old hard rocks and fold ranges. The Pacific coastal strip has a curious mineral industry which is, however, associated with its dry desert climate. That is the nitrate industry of Chile. The great fold range of the Andes was uplifted mainly in late geological times—in Tertiary times. Indeed some of its peaks are active volcanoes, the most notable being Chimborazo and Cotopaxi. Valuable deposits of silver, copper, and other ores occur in the older parts, especially in the broad high plateau of Bolivia. We have noticed in other parts of the world that oilfields are often found on the margin of fold mountains. Such is the case in South America, and valuable oilfields have been found on the flanks of the Andes—in the Maracaibo Basin of Venezuela, in Peru, Columbia, and Argentina.

Climate. The climates of South America are controlled to a great extent by its physical features, but especially by the great chain of the Andes. The northern two-thirds of the continent are dominated by the Doldrums and the Trade Winds—blowing from the north-east

and south-east. The Amazon basin comes under the influence of the Doldrums twice a year (when the sun is overhead) and receives a heavy convectional rainfall. The regions to north and south are mainly dependent on the Trades for their rainfall. As these winds are moving to warmer latitudes they are poor rain-bearers unless they have first crossed a large expanse of ocean and then been forced to ascend as by high land. By the time they have crossed the Andes and reached the western side of the continent they are dry, so that on

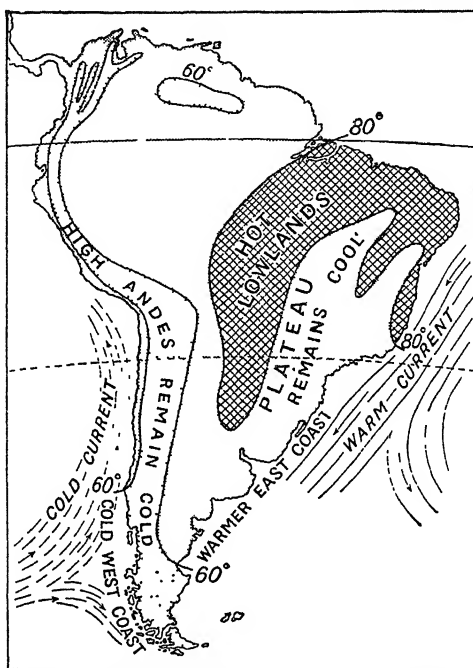


FIG. 62.—The temperature of South America in January (hot season).

The parallels of latitude marked are the Equator and the Tropic of Capricorn.

the Pacific Coastal Strip we find the curious features of a long, narrow, almost rainless desert bordering the ocean. The southern third of the continent is under the influence of the North-Westerly winds of the mid-latitude belt, which bring abundant rainfall to the southern part of the Pacific Coastal Strip. The mountains again extract most of the moisture from the winds, so that here in the south we find desert again, but this time on the Atlantic side of the Andes—the Patagonian Desert. When the sun is in the south—that is, shining over the southern Tropic, there is a strip of the western coast which is under the influence of the Trade Winds—dry because they have passed over the Andes. But when the sun is

shining over the northern Tropic this strip comes under the influence of the Westerlies. It has then a Mediterranean climate—hot dry summers and warm moist winters. The town of Valparaiso is in the north of this belt. Remember that the seasons are the reverse of those in the Northern Hemisphere.

Temperature—Conditions in January. At this period of the year the sun is shining nearly over the Tropic of Capricorn. The hottest regions are the lowlands south of the equator. Notice the very

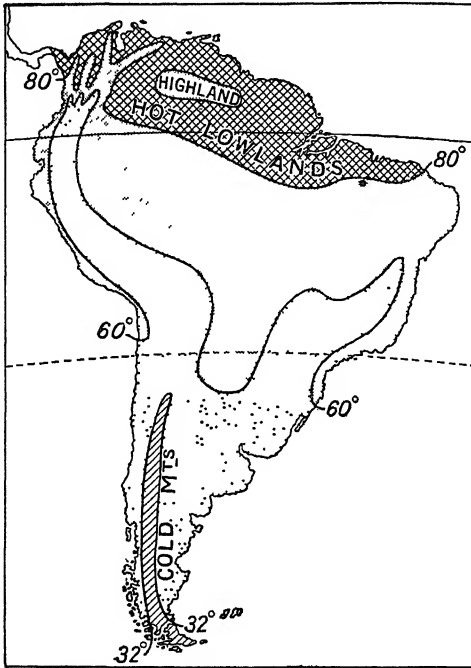


FIG. 63.—The temperature of South America in July (cold season).

remarkable fact that the east coast is warmer than the west coast. As in Australia, Fig. 62 shows that the west coast is influenced by winds blowing from over the cold Peruvian current coming from Antarctic regions. This is a good example of the influence of a cold current on temperature of neighbouring lands.

Temperature—Conditions in July. At this period of the year the sun is shining vertically over the northern Tropic. The hottest part of the continent is in the north, and the southern part of the continent is colder. Notice that the influence of the cold current on the west coast is still seen, but not so markedly as in the summer. Compare the temperature of Pará—nearly on the equator—in Fig. 63 and Fig. 62. Notice it has a typically equatorial climate—nearly 80° the

receiving some rain (Mediterranean region). Patagonia is again dry, being still on the lee of the Andes.

In the United States there is a tendency for the rain-bearing winds to blow up the Mississippi Valley. Similarly in South America the rain-bearing winds tend to blow up the Paraná-Paraguay Valleys and right up the Amazon Basin. In eastern Brazil the rain-bearing Trade Winds are dried in crossing the edge of the plateaus, and so the São Francisco Valley is very dry.

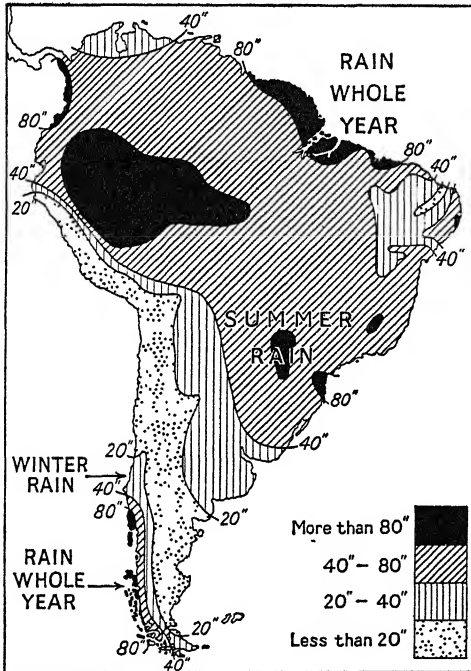


FIG. 65.—Rainfall map of South America for the whole year.

Compare the Murray Basin. The coast enjoys a moderate rainfall, but the winds do not penetrate to the interior of the plateau, with the result that the surface of the latter is somewhat dry. In the north-west of the continent, along the Pacific coast of Colombia, the rainfall is increased by a monsoon.

Natural Vegetation. The natural vegetation of South America reflects the climatic conditions. The hot wet lowlands of the Amazon Basin and the coastal plain are covered with very dense Equatorial Forests. The Amazon Basin is the largest area of Equatorial Forest in the world. The plateaus lying in the Tropics (Plateaus of Guiana and Brazil), as well as a large part of the Orinoco Basin, are occupied by Tropical Grasslands, or Savanas. The

grasslands of the Orinoco have received the special name of Llanos. South of the Brazilian Highlands are warm Temperate Forests, passing into the Mid-Latitude Grasslands of the Argentine, which in turn become drier and pass into the mid-latitude Desert of Patagonia. On the west of the Andes a hot desert occupies the rain-shadow area in the Tropics. South of this is the small area of Mediterranean vegetation, which in turn passes into Cool Temperate Deciduous Forests. Follow all these points carefully in Fig. 66.

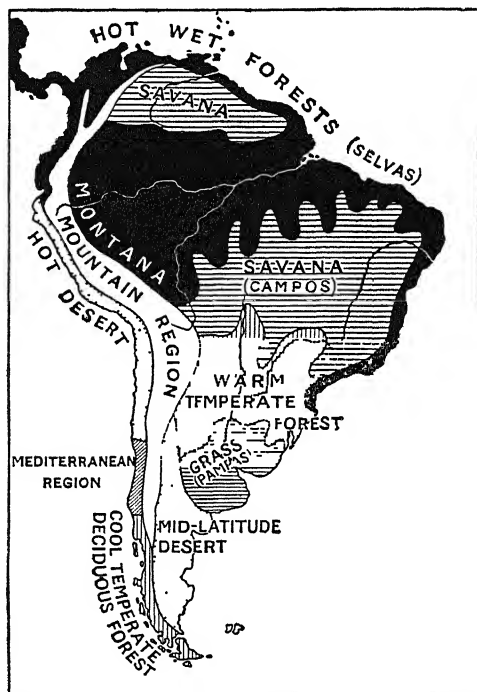


FIG. 66.—The natural vegetation of South America.

Natural Regions. Combining what we have now learnt of the physical features, the climates, and vegetation, we are now in a position to divide South America into its major Natural Regions. We can take each of the main physical regions, and we shall see that we can divide each up according to climate and vegetation. Fig. 67 gives a key to these regions.

(1) *Natural Regions of the Pacific Coastal Strip.*

(a) Wet Region in the north, as far south as the equator.

(b) Desert Region of North Chile and Peru. Very little rain and of little importance. Great areas of this dry region, however, yield large quantities of a salt known as nitrate, which is valued

in the agricultural countries of Europe as a fertilizer. This salt occurs as a crust over the surface of the desert. Were there any rainfall it would all dissolve and be washed away. Most of the towns in this dry region are nitrate ports and also serve as outlets to mountainous regions behind.

(c) The Mediterranean Region, a narrow strip south of Valparaiso enjoying a Mediterranean climate and having the usual Mediterranean products.

(d) The Cool Temperate or mid-Latitude Deciduous Forest Region with heavy rainfall and covered with forests.



FIG. 67.—The major natural regions of South America.

(2) *The Andean Chain.*

(a) The Northern Andes, consisting of several parallel chains separated by the fertile valleys of the Cauca and Magdalena.

(b) The broad Central Andes, chiefly noted for mining.

(c) The narrow Southern Andes, acting as a divide between east and west.

(3) *The Central Plains.*

(a) The Basin of the Orinoco and lowlands fringing the coast, enjoying a tropical climate and, where developed, producing such

characteristic tropical products as sugar and cocoa. The natural vegetation is mainly coarse grass, and the grassland country is known as the Llanos.

(b) The Amazon Basin. Most of this immense basin falls within the belt of equatorial rain at all seasons, and is clothed with dense Equatorial Forests (Selvas) of huge hardwood trees. Like other regions of dense tropical forest, it is sparsely populated by backward tribes. It is the home of the most important of the rubber-bearing trees, but the best trees growing wild have been found and killed by careless tapping, so that the great rubber-producing regions of the world are now the plantations of Malaya and Indonesia.

(c) The Basin of the Paraná-Paraguay and the Pampas. The north of this region is forested, with an open savana type of forest forming a region known as El Gran Chaco—the great hunting ground. To the south, in the Argentine, are the Pampas or mid-latitude grasslands which now form one of the great wheatlands of the world.

(d) The Patagonian Desert. The northern part of this region supports a few sheep, but the greater part is a dry waste of shingle and sand, except along valleys where water is available. In the extreme south this cool mid-latitude desert passes into land where there is enough rain to produce sheep pastures.

(4) *The Eastern Highlands.*

(a) The Highlands of Guiana and Venezuela. This region has great mineral resources, but is little developed owing largely to difficulties of access and an unhealthy climate.

(b) The Brazilian Highlands. This region of old crystalline rocks has vast mineral resources. The coastal portion has a rich soil and a tropical climate, ideal for coffee and other tropical products.

Population. The original inhabitants of South America, when the continent was discovered by Europeans in the fifteenth and sixteenth centuries, were American Indians—some races, like the Incas on the plateaus of Peru, were highly civilized. Most of the Indians remaining are very backward, uncivilized races found in such poorly developed and inhospitable tracts as the dark forests of the Amazon. The civilized nations now inhabiting South America are descended mainly from the Portuguese and Spanish explorers who settled in the country, and Spanish is the usual language over most of the continent except Brazil, where Portuguese is spoken. The Spanish descendants are found on both sides of the Andes, but especially to the west, whilst the Portuguese are mainly on the east. In the northern countries many negroes were introduced for labour in the plantations, whilst of recent years large numbers of European immigrants,

especially Italians, have settled in the more temperate lands of the south. For long Brazil, the largest country of South America, was a colony of Portugal, but now, with the exception of the small colonies of British, French and Dutch Guiana, and the British island of Trinidad, all the countries of South America are independent republics. Notice from the population map that nearly all the continent is poorly populated. There are three areas of heavy population: (a) around Valparaíso, which enjoys a productive Mediterranean climate; (b) that part of the Republic of Argentina around Buenos Aires where the temperate grassland climate is ideal for wheat and cattle; (c) that part of the coastal lands of the Eastern Highlands where soil and climate favour the growth of coffee, etc. Notice what a splendid example we have of the climatic control of the distribution of population.

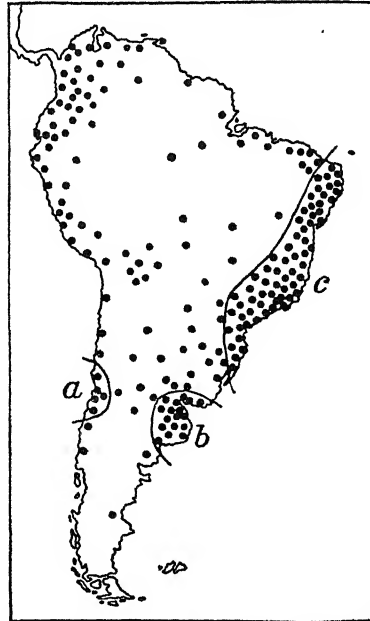


FIG. 68.—The population of South America.

Each dot represents 500,000 people. Notice *a*, *b*, and *c*, the three areas of concentration of the population and the reasons for the concentration.

The following table is included for reference purposes:

Country	Area (1,000 square miles)	Population. (Millions) 1950-1
Brazil	3,288	56.0
Argentina	1,080	18.0
Chile	286	6.0
Venezuela	352	5.5
Colombia	440	11.5
Ecuador	110	3.2
Peru	514	8.5
Bolivia	413	3.0
Uruguay	72	2.5
Paraguay	157	1.5
British Guiana	83	0.5

ARGENTINA

Position and Size. The Argentine Republic occupies an area of roughly 1,080,000 square miles, or nearly two-fifths the area of continental United States. The total population at the middle of 1958 was 20,250,000. The population is concentrated in the fertile Pampas around Buenos Aires, the capital alone having a population of nearly 4,000,000. A quarter of the total population consists of "foreigners"—recent immigrants, mainly of Italian and Spanish origin. Argentina differs from most of the South American



FIG. 69.—Political map of South America.

countries in that the population is almost entirely of European stock. The dwindling Indian population is estimated to be between 20,000 and 30,000. With the exception of a small tract in the extreme north, the whole of Argentina lies in the South Temperate Zone, but stretches through a wide range of latitude, in all no less than 40°. Argentinian independence from Spain was declared in 1816, but it was not until 1853 that stable government, with a constitution almost identical with that of the United States, was established. The progress of the Republic in the last few decades has been very rapid, and the discovery of the cold-storage methods of transporting meat has been a potent factor in establishing the importance of

Argentinian foreign trade. Urbanization has been accompanied by a great development of industry, despite inadequate power resources. The Republic is divided into 24 provinces and 1 federal district (Buenos Aires).

Physical Features and

Geology. The crest of the Andes or, more strictly, the Atlantic-Pacific water-parting, forms the boundary between Argentina and Chile, so that along its western borders Argentina includes a strip of the Andine chain. Eastwards this gives place to a broad belt of very varied topography and geology which may be called the Sub-Andine belt or the Pampean hinterland, and which includes the foothills of the Andes or the Pre-Cordillera. This Sub-Andine belt passes north-eastwards into the swampy forested Chaco lowlands; eastwards into the flat or rolling grasslands or Pampas; south-eastwards into the Great Plateau of Patagonia. Mining is not of great importance in Argentina. Petroleum is the leading mineral product, and is found in two main areas: around Rivadavia on the coast of Patagonia, and on the flanks of the Andine system in the north of the country. Amongst the varied rocks of the Sub-Andine region, gold, silver, copper, tin, tungsten, and coal are worked, the first four especially in the province of Catamarca.

The annual output of crude oil amounts to 20–25,000,000 barrels—two-thirds from State oilfields.

The Climate and Natural Vegetation of Argentina. Reference to Fig. 67 will show that, apart from a strip of the high Andine region with an “Alpine” climate, Argentina falls into three climatic-vegetation regions—the Warm Temperate Forest or Chaco region of

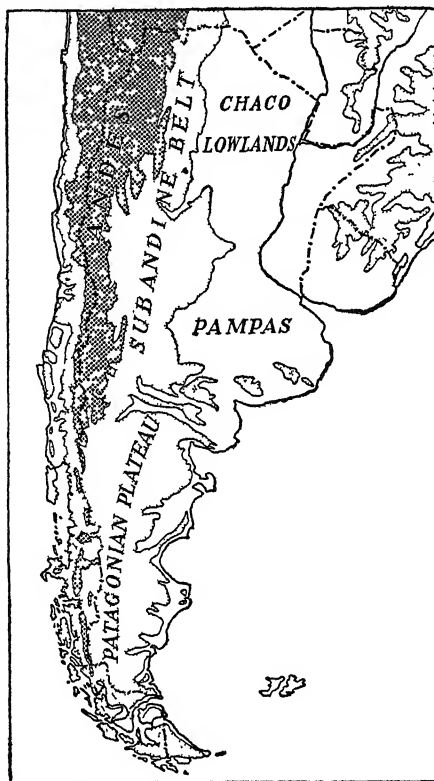


FIG. 70.—Physical map of Argentina.

Land over 500 feet, lightly dotted; over 5,000 feet dark.

the north; the Mid-Latitude Grassland region of the centre, and the cool Mid-Latitude Desert or Patagonian region of the south. In Fig. 67 a strip with the last mentioned climate is shown stretching northwards to cover the Sub-Andine Zone between the Grassland and the Andes. The climate of this Sub-Andine belt differs in some particulars from that of Patagonia and will be mentioned again in dealing with the natural regions of Argentina.

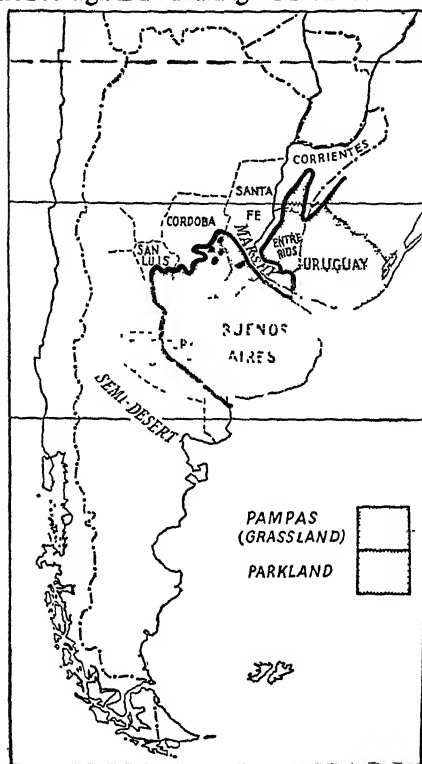


FIG. 71.—The Grasslands of Argentina and Uruguay.

The forests of the northern part of the republic are of importance as yielding the quebracho wood and quebracho extract used in tanning.

Agriculture. Out of a total area of 700,000,000 acres about 250,000,000 acres are classed as suitable for agriculture; 250,000,000 acres as suitable for stock farming; 120,000,000 acres are woodland; 80,000,000 acres arid or mountainous. About 10 per cent. or 75,000,000 acres are actually cultivated. Of the cultivable portion 10,000,000 acres require irrigation. Despite the rapidity with which arable farming has been spreading at the expense of pastoral farming only about one-quarter of the suitable land is as yet under crops.

The following table is for reference purposes:

Crop	Acreage (millions)				Yield (thousands of metric tons)			
	1909-13	1925-26	1936-37	1952-53	1909-13	1925-26	1936-37	1952-53
Wheat	16.1	19.0	17.7	15.1	4,000	5,200	6,782	7,800
Maize	8.7	10.7	16.0	8.3	4,870	7,090	9,135	3,620
Oats	2.4	3.0	3.1	3.7	787	1,170	792	1,106
Linseed	—	5.8	7.5	2.4	—	1,900	1,936	570
Sugar	—	0.24	0.37	—	176	396	371	710
Vine	0.27	0.28	0.42	—	—	—	—	—
Cotton	0.10	0.27	1.03	—	1.5	68	31	150
Tobacco	0.02	0.02	0.04	0.10	5.7	9.3	15	38

Animals	Millions			
	1914	1922	1930	1952
Cattle	25.9	37.1	32.2	45.3
Sheep	43.2	36.2	44.4	54.7
Pigs	2.9	1.4	3.8	4.0
Horses	—	—	—	7.2

Wheat. Wheat, maize, oats, and flax are all of the greatest importance in the Temperate Grassland region¹ and so are cattle and sheep. The importance of each particular crop and its distribution *within* this great region are determined mainly by rainfall. Fig. 71 shows roughly the extent of the grasslands; Fig. 72 shows the rainfall conditions within the belt. It will be seen from Fig. 73 that the great wheat lands lie in the drier and cooler parts of the Grassland belt. In the inter-war years up to about three-fifths of the crop were exported, mainly through the ports of Buenos Aires and Bahia Blanca, but the proportion is now less.

Maize. By way of contrast with the wheat, the maize belt lies in the wetter and warmer parts of the grassland region. Argentina used to be the principal maize-exporting country in the world, supplying more than three-quarters of the maize which enters into international trade. Exports averaged over 8 million metric tons in 1935-38, but are now less. In 1947-51 they averaged less than 1½.

Oats are grown almost entirely in the cooler south-eastern parts of Buenos Aires, between Bahia Blanca and Tandil, and again a large proportion of the crop is exported.

Flax is grown mainly for the sake of linseed, and up to 95 per cent. of the crop was formerly exported. Export of linseed ceased in 1946 to 1950 but there is a large export of linseed oil. Linseed is a crop of unusual importance in Argentina, and grows in the wheat and maize belts. More than 40 per cent. of the linseed or linseed oil entering into international trade is Argentinian. *Sunflower seeds* now furnish the country with popular edible oil; rapeseed oil and groundnut oil are also produced in large quantities.

Sugar-cane is grown mainly in the northern part of the Sub-Andine region, including that part of Argentina which lies within the Tropics, and where the abundant sunshine of a dry climate supplies the necessary warmth, and mountain streams from the Andes the necessary moisture. The provinces of Tucuman, Jujuy, and Salta are the sugar-producing regions, the town of Tucuman being the chief centre.

The *Vine* is also a specialized product of the Sub-Andine region but

¹ Roughly 90 per cent. of the cereals of Argentina grow in the grassland region.
5—Pt. II

is found farther south than the sugar, chiefly in Mendoza and San Juan, with the towns of Mendoza and San Juan as centres.

Cotton increased rapidly in importance in the years 1920-29, so that Argentina ranked after Brazil and Peru as a producer in South America. In 1909-13 the production averaged 637 metric tons; in 1937-38 it was 61,000 tons, in 1951-52 150,000 tons of which

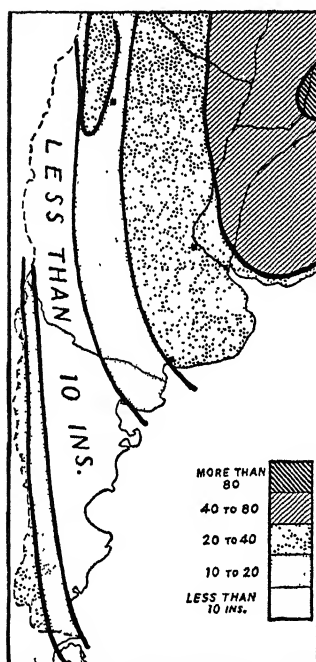


FIG. 72.—The rainfall of Argentina.

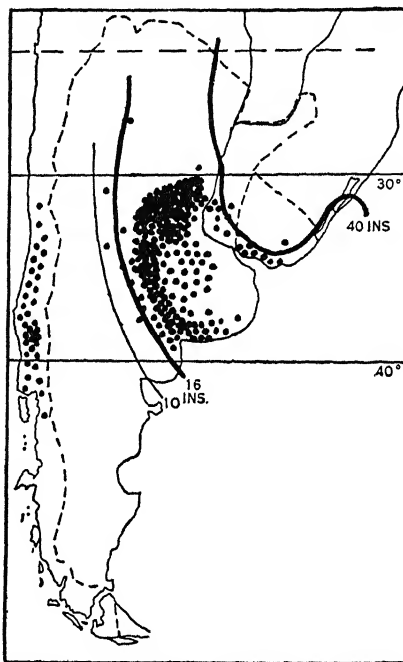


FIG. 73.—The distribution of wheat in Argentina, Chile, and Uruguay.

Each dot represents about 1,000,000 bushels. In addition to the rainfall lines marked, that for 20 inches passes through the heart of the wheat belt.

36,000 tons were exported. Most of the cotton is grown on the fringes of the Chaco lowlands in the north; it has been estimated that land available and suitable for cotton cultivation exceeds the total area of the cotton lands of the United States.

Cattle. The development of the pampa of the Argentine commenced in earnest about 1870, when sheep rearing began to be undertaken seriously. Cattle rearing, however, remained unimportant so long as the only product suitable for export was the hide. The necessary stimulus to the breeding of cattle for meat was afforded by the establishment of freezing works. Native cattle were graded up by the finest imported cattle—especially Shorthorns and

Herefords from England. Natural pasture has given place to alfalfa, which now occupies more than a third of all the cultivated land in Argentina. Of recent years cattle have increased in numbers, whereas sheep have declined. Whilst the spread of wheat cultivation has tended to push sheep rearing to the drier part of the country, beef cattle rearing has held its ground owing to the extended use of alfalfa for cattle fattening. The future progress of wheat and cattle will depend on comparative prices and value of the produce. As

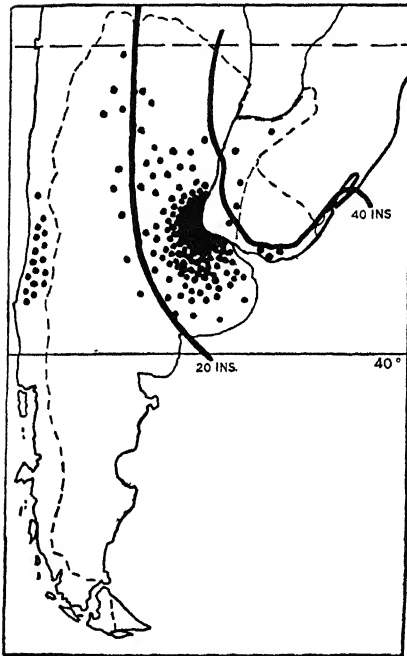


FIG. 74.—The distribution of maize in Argentina, Chile, and Uruguay.

Each dot \approx 1,000,000 bushels. Argentina, total about 3,600,000 metric tons or 135,000,000 bushels. Nearly all the maize grows in the warmer regions, between the Tropic of Capricorn and 40° S. and where the rainfall is more than 20 inches.

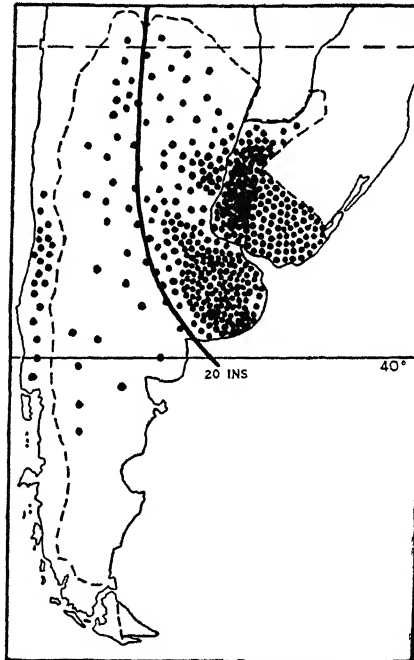


FIG. 75.—The distribution of cattle in Argentina, Chile, and Uruguay.

Each dot represents 100,000 cattle. Argentina, 45 (1956); Chile, 2.5 (1955), and Uruguay, 8 (1955) millions. Contrast with sheep.

shown in Fig. 75 the cattle are concentrated in the damper parts of the grassland. Since 1914 the expansion of the dairying industry in eastern Buenos Aires has been very marked and has led to a large export of butter. The rapid recent increase of the Argentinian population has meant a greater home consumption and a smaller surplus for export not only of meat but of most primary produce.

Sheep. As shown in Fig. 76, sheep are much more widely distributed than cattle, and the total numbers have decreased considerably in the past half-century, but a livestock census in 1952 showed some revival. Sheep kill alfalfa by close feeding, and have not benefited by the extension of its cultivation in the pampas; indeed cereals and alfalfa may be regarded as combining to eliminate sheep farming from the richer parts of the pampas. Nevertheless more than 40 per cent. of the sheep of Argentina are in the province of Buenos Aires. The

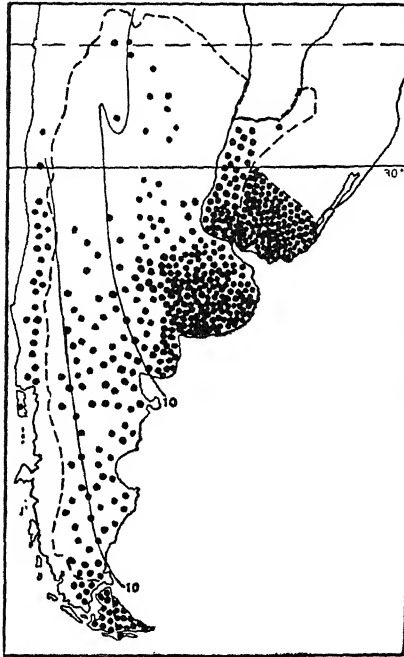


FIG. 76.—The distribution of sheep in Argentina, Chile, and Uruguay.

Each dot represents 100,000 sheep. Based on 1955 figures (Argentina, 44; Uruguay, 23; and Chile, 6 millions). Nearly all the sheep are south of 30°, and there are fair numbers where the rainfall is less than 10 inches per annum.

The “River Plate” wool, as the Argentinian wool is termed, is not so highly esteemed as Australian, New Zealand, and South African, and has the reputation (much less deserved than formerly) of being dirtier.

Goats are numerous in the arid Sub-Andine region.

Manufactures. The leading manufacturing industries in the Argentine are connected with the preparation of the raw material provided by the pastoral and agricultural industries. The first is still meat refrigeration, and Buenos Aires has the largest refrigerating plant in the world with a daily capacity of 5,000 cattle and 10,000 sheep. Flour milling ranks second. However industrialization of all types has been expanding rapidly and the number of factories doubled between 1940 and 1950. Cotton textiles, woollen textiles, and rayon yarn and textiles are all important.

Population. Out of the total population of rather over 18,000,000 the concentration in the grassland region is most marked. Nearly half is found in the capital and province of Buenos Aires; another 3,000,000 in the neighbouring grassland areas. There are secondary centres of concentration in the richer and more developed parts of the Sub-Andine region—round such towns as Tucuman, San Juan, and Mendoza. The population is still growing rapidly—from

1920-25 there was a net annual gain of 90,000 by immigration, in 1950 alone it was over 128,000. After the war plans were set on foot to assist 4,000,000 immigrants from Europe, preference being given to Roman Catholics. Amongst the immigrants, Italians and Spaniards predominate, but a feature of inter-war years was the settlement of Jews on the land. The Jewish Colonization Association acquired nearly half a million acres.

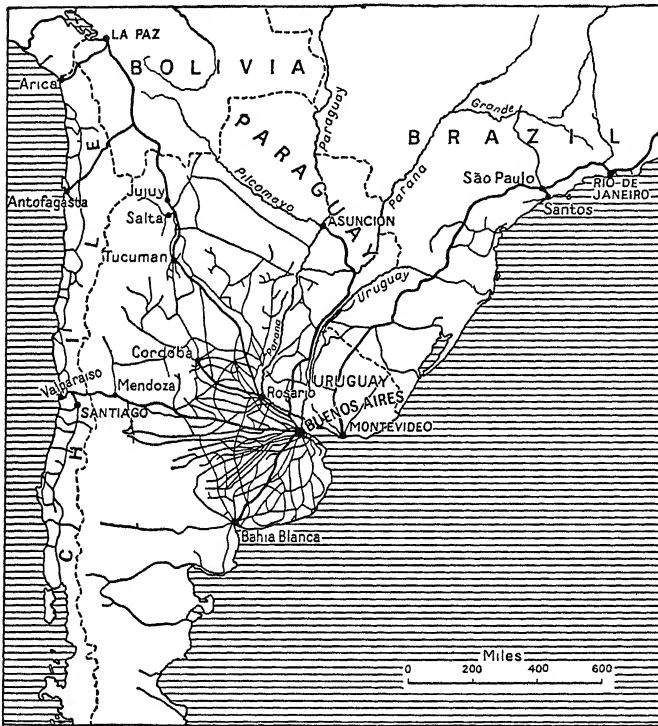


FIG. 77.—The railways of Argentina and connections.

Communications. The grassland regions are well supplied by railways, and there is through communication with Chile via Mendoza, with Bolivia via Jujuy, and across the R. Uruguay with Uruguay and Brazil. There are over 28,000 miles of railway, which were nationalized in 1948. Formerly much British capital was invested in Argentinian railways. The Argentinian railway system suffers from a triple mixture of gauges.

Roads are also under the Ministry of Transport and have been extending rapidly. In 1940 the trans-Andine road tunnel between Argentina and Chile was opened, previously the road had climbed from numerous hairpins over the Uspallata Pass.

Commercial aviation is also important. The River Paraguay is navigable right through Argentina into Paraguay. The three main sea outlets of Argentina are Buenos Aires, Rosario, and Bahia Blanca, from which centres the railways may be regarded as radiating. The natural outlet of the maize belt is Rosario and much of the wheat passes through Bahia Blanca, but apart from this a predominating

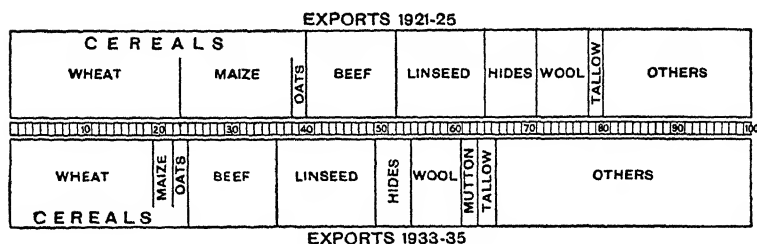


FIG. 78.—The exports of Argentina.

In addition to the exports enumerated, extract of quebracho represented nearly 2 per cent., sheep-skins nearly 1 per cent.

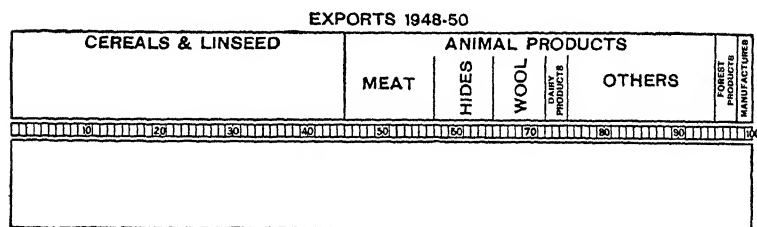


FIG. 79.—The exports of Argentina in recent years.

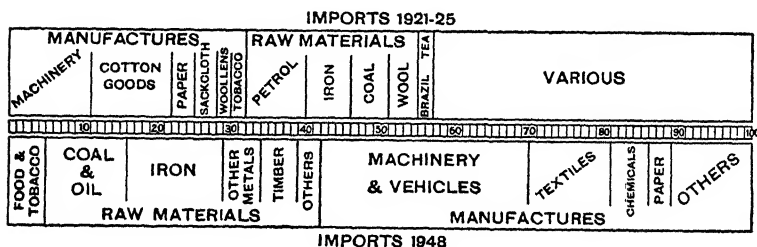


FIG. 80.—The imports of Argentina.

proportion of foreign trade passes through Buenos Aires. Indeed, the congestion there has recently proved beneficial to such outports as La Plata and Zarate.

Foreign Trade. The principal items are shown in Figs. 78-80. With the rapid increase in the population, smaller proportions of meat and cereals are available for export and the growth of Argen-

tinian industries has restricted imports of certain types. These changes are greatly to the detriment of Britain.

The direction of foreign trade is illustrated in Fig. 81. The importance of the United Kingdom and United States should be noticed, but there is a noteworthy difference in the character of the trade.

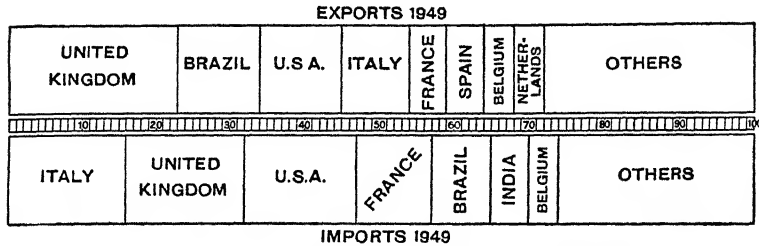


FIG. 81.—The direction of foreign trade in a recent year.

THE NATURAL REGIONS OF ARGENTINA

The Chaco Lowlands. The name Chaco (a hunting ground) is applied to the broad stretch of swampy, forest-covered, alluvial plain which occupies the north of Argentina (as well as the neighbouring parts of Bolivia and Paraguay) from the foothills of the Andes on the west to the Paraguay River on the east. During the rainy summer, huge lakes and swamp areas are formed, the rivers have ill-defined courses which change from year to year. Yet in the long dry season the utmost difficulty is encountered in securing supplies of drinking water. The forest is sometimes dense, but generally rather open and broken by tracts of savana and marsh. Varying greatly from place to place, the characteristic forest is the quebracho forest, though the area where true quebracho is cut for tanning materials is limited. Its remoteness, its inaccessibility, the difficulties of water-supply, the plagues of insects, and the hostility of the sparse Indian population have combined to hinder settlement and limit exploration of this vast region. Quebracho cutting is pursued along the belt near the Paraguay; agriculture has made some progress along the southern margins between Santa Fé and Tucuman and cattle-rearing in the strip near the Andine foothills; otherwise this large area is still very undeveloped. Its potentialities are immense.

The Pampa. The Argentine Pampa covers an area of a quarter of a million square miles, occupying a semicircle with Buenos Aires as centre, and a radius of 350 to 400 miles—stretching thus to Santa Fé in the north, to Cordoba and S. Luis in the west, and to the coast south of Bahia Blanca in the south. Except for the ranges in the west in Cordoba and the hills of south-western Buenos Aires, the whole of the pampa lies below 500 feet. The greater part appears to

the eye dead level. The natural vegetation is, of course, grass, and the landward limit is defined by the transition into scrub or forest—approximately on the west along the rainfall line of 16 to 17 inches. Much more equable than the grasslands of the Northern Hemisphere, there is a general absence of severe frosts in winter, and of extreme heat in summer, but over most of the pampa there is the spring or early summer rainfall maximum which favours the growth of grass and cereals. The soil, too, is a deep stoneless loam, the pristine richness of which is being maintained by the extensive cultivation of alfalfa or lucerne, a plant capable of fixing atmospheric nitrogen and so enriching rather than impoverishing the soil. Details have already been given of the agricultural and pastoral industries of the pampa. With no mineral deposits, not even lime or building stone, and no fuel, the pampa is likely to remain for many years one of the most exclusively agricultural areas in the world.

Considered in detail, the rolling plain of the pampa can be divided into separate parts. To the north-east the pampa rim overlooks the Paraná by a cliff-like edge, the *barranca*. It gives place inland to the broad flat valley plain of the Rio Salado which rises southwards to the scant covered Sierra del Tardil, reaching 1,600 feet. Southwards of this ridge the soils have calcareous layers and the plains give place to the Sierra de la Ventana. This ridge is also scantily covered and rises to 4,000 feet north of Bahía Blanca.

With the exception of the Paraná and Uruguay there are no navigable rivers; indeed much of the drainage of the pampa is, in part at least, underground. The life of the region, therefore, depends upon the railway network and latterly of roads, though road construction across the stoneless dusty pampa is not simple. It may be noted that the province of Buenos Aires embraces a very large portion of the pampa; the province of Entre Rios, lying as it does between the Paraná and Uruguay, is often called the "Mesopotamian Region."

The Sub-Andine Region. The natural region now to be considered forms a strip lying between the lowlands of the Chaco and the Pampa to the east, and the lofty Andes to the west. It consists for the most part of mountain or hill ranges separated by deep valleys, but is very varied in character. The region may be considered as extending southwards to about the valley of the Rio Colorado (lat. 37° S.) farther south it fades into the Patagonian Plateau. The whole region is arid; nearly the whole has a rainfall of less than 16 inches—towards the north mainly in summer, as on the Chaco lowlands. Irrigation is of supreme importance, and nearly all settlements exist where the rainfall can be supplemented. The natural vegetation is varied, but scrub and dry forest predominate. The three industries of the region are stock-rearing, agriculture, and mining. Cattle are reared on the scanty scrublands, and fattened on valley-grown

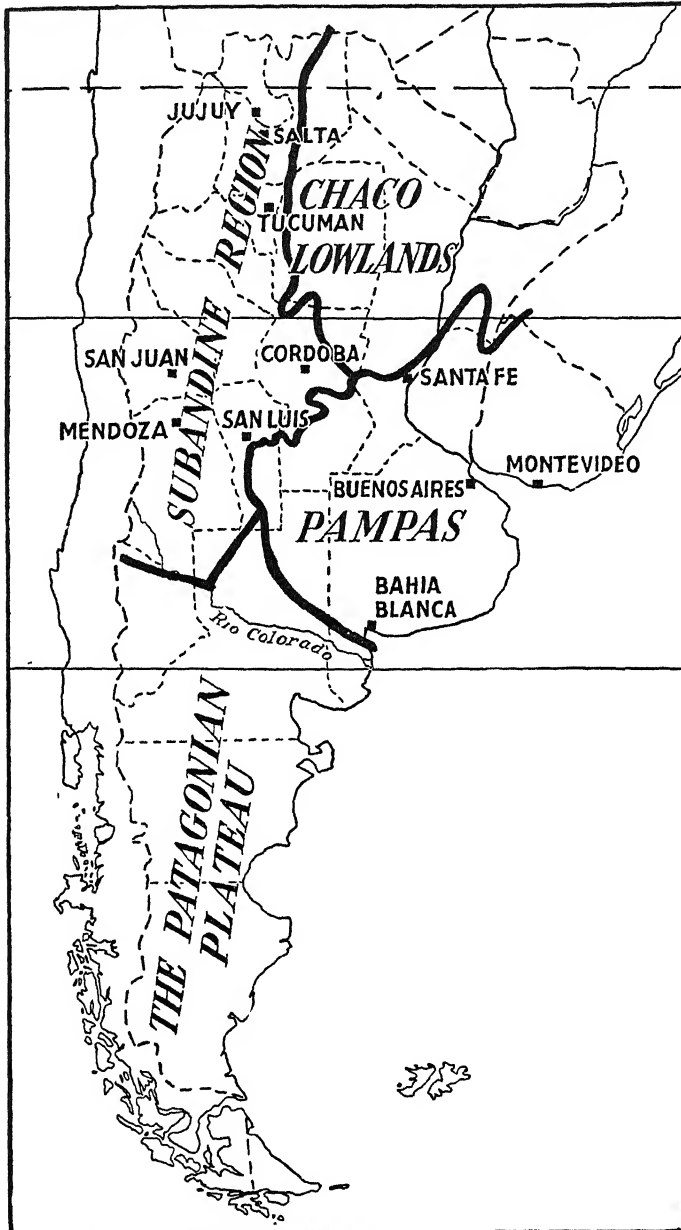


FIG. 82.—The natural regions of Argentina.

NOTE Although not separately shown on this map, the Andine belt should be distinguished as a distinct region. As mentioned in the text, the folded rocks of the Andes are often separated from the regions to the east, especially in Patagonia, by a marked trough

lucerne: the sending of the cattle to the Buenos Aires region recalls the state of affairs existing in North America where the cattle from the western ranches are sent into the corn belt for final fattening before slaughter. The Argentinian goat-rearing industry is a comparatively recent development on these dry lands: the chief products are the skins. Agriculture throughout the region is concerned mainly with the growing of wheat and maize for local consumption, but the large-scale production of sugar and wine in the north-central and south-central portions of the belt, as already mentioned, should be noted. Though minerals are widely distributed, mining is relatively unimportant. Mendoza, San Juan, Tucuman, Salta, and Jujuy are centres worthy of note: their railway communications should be carefully studied.

The Patagonian Plateau. Argentina south of the Rio Colorado consists for the most part of an arid plateau organized into five territories. There is little or no coastal plain except near the mouths of the larger valleys; the whole country is built up of a series of plateaus ranging in height from 1,000 to 3,000 feet above sea-level. Geologically the plateaus consist of horizontal or slightly inclined strata resting on igneous and metamorphic rocks, and a marked trough often separates this area from the folded rocks of the Andes. Thus three parallel strips may be separated—the coastal, the plateau, and the trough. The scanty rainfall comes mainly in winter from winds which find their way across the Andes from the Pacific; hence it is the western edge of the plateau nearest the Andes which is best watered and affords the best sheep pasture. Fewer than 250,000 people live in Patagonia, and many of these are on the irrigated settlements along the Rio Negro, but nowhere in the world is the proportion of sheep per head of population so high as in parts of Patagonia. In Tierra del Fuego it is said to reach 400 per inhabitant. As the sheep are crowded out by grain and cattle in the pampa, so the Patagonian plateau becomes more and more the great sheep-rearing region of Argentina.

PARAGUAY

Paraguay is a small republic mainly between the Paraná and Paraguay rivers. A large area of the Chaco forest country, described under Argentina, lying west of the Paraguay, was claimed both by Bolivia and Paraguay. The boundary was settled in 1938 after a protracted war to the advantage of Paraguay. It is usual now to refer to Paraguay proper or the “oriental” section between the Paraguay and Upper Paraná river (61,705 square miles) and the “occidental” section now covering 95,337 square miles. The Chaco is inhabited by Chaco Indians and produces quebracho; its importance is due to the recent discoveries of oil. The main part of Paraguay includes part of the Warm Temperate Forest country from

which Paraguay tea (*Yerba maté*) is obtained both from wild and cultivated trees. In the south the country borders the Brazilian Grasslands, and this is the most important part of the country. There are said to be 5,000,000 cattle but, owing to inaccessibility, hides and jerked beef (*i.e.* sun-dried in strips) are the chief products. Maize is the common cereal; fruits, especially oranges, are widely grown. The formerly primitive agriculture is changing, partly through a system of training smallholders. Rice, sugar, bananas, grapefruit, and cotton are now extensively cultivated.

Asunción, the capital on the Paraguay, has a population of over 140,000, and is reached by the great highway of the country, the Paraguay River. There is, however, through railway communication, without break of bulk, with Buenos Aires.

URUGUAY

The Republic of Uruguay, with an area of 72,000 square miles and a population of 2,500,000, is bounded on the west by the Uruguay River, on the south by the estuary of the La Plata and the Atlantic, on the north-east by southern Brazil. As shown in Fig. 71 it lies between the rich cattle grasslands of southern Brazil and the Argentinian pampas. Except for a coastal strip, the whole country has a rainfall of over 40 inches, and the grassland is a rich type, not entirely treeless and hence described as parkland. As shown in Figs. 73 to 76, Uruguay is not a wheat country, nor even a maize country, but essentially a pastoral country. Only 7 per cent. of the surface is devoted to agriculture, the remainder to ranches or mixed farms. In 1951 there were 8,000,000 cattle and 23,000,000 sheep.

Animals and animal products comprise 95 per cent. of the exports. The importance of the chilled meat industry may be gauged from the statement that the four chief chilling works handled in the inter-war years 700,000 carcasses of beef and 1,500,000 carcasses of mutton annually. Live animals, meat extracts, salted meat, wool, skins, hides, and flax are the other exports. The imports are cotton, foods, iron, and other manufactures and coal.

Montevideo, the capital, has now a fine artificial harbour, and is a city of nearly a million inhabitants. The other centres are *Paysandu*, *Salto*, and *Mercedes*.

THE FALKLAND ISLANDS

Far from land in the windswept stormy seas of the South Atlantic lies the group of islands known as the Falkland Islands, constituting a British Crown Colony. There are two main islands, East Falkland and West Falkland, with numerous adjacent smaller ones, and the group lies some 300 miles east of the Magellan Straits. The islands are in latitude 50° S., which places them in the westerly wind-belt,

corresponding in position with the British Isles in the northern hemisphere. It is not surprising to find that they have a climate which can be compared with parts of Scotland where there are strong westerly winds, damp and moist, with a considerable rainfall, combined with much cloudiness and an absence of sunshine. Thus the climate is not one which encourages arable farming and the growth of crops, but it is one which permits the growth all the year round (there are no very cold winters) of grass and other plants affording sustenance to sheep. So large areas of the Falkland Islands are devoted to sheep-rearing, and wool is the principal export. It is claimed that nearly 3,000,000 acres are sheep pasturage and there are nearly 1,000,000 sheep, but the population is only between two and three thousand, of whom half live in the chief town, Stanley.

Included under the Falkland Islands are the dependencies of South Georgia, the South Shetlands, the South Orkneys, and Graham's Land. South Georgia, still more remote and climatically uninviting than the Falklands themselves, is important as a centre of whaling.

Both whaling and sealing operations are extremely important and in the years following the Second World War there was a great shortage of fats and oils, so that the production of whale oil for the manufacture of margarine was actively pursued.

The South Shetlands and South Orkneys are remote groups of islands, whilst Graham's Land is part of the Antarctic continent.

BRAZIL

Position and Size. The independence of Brazil, formerly a Portuguese colony, dates from 1822, but it was not until after the revolution of 1889 that it became a republic, under the title of the United States of Brazil (*Estados Unidos do Brasil*). There are twenty states, five national territories, and one federal district. The total area of the country is over 3,250,000 square miles—or more than that of the United States. The population according to the census of 1950 was 52,645,479 and is increasing at the rate of more than a million a year. By far the greater part of the country lies in the Tropics, the exception being three important states in the south.

Physical Features and Geology. Very broadly, Brazil includes three great units—a portion of the Guiana highlands on the north; the Amazon basin, and the great Brazilian plateau. As already stated, the first and the third consist of ancient rocks, in some areas richly mineralized. In the southern part of the plateau there are broad stretches of volcanic rock, which have given rise to excellent soil. Apart from these three units, Brazil also includes in the extreme west the lower slopes of the Peruvian Andes, and in the south-west a portion of the lowlands of the Upper Paraguay.

Coal, mostly of inferior quality, occurs in the four southern states, but most of the minerals are associated with the old rocks of the heart of the plateau. Gold produced reached a peak of 180,000 ounces in 1952. Huge deposits of iron ore exist especially in Minas Geraes, indeed these are probably the largest and richest deposits in the world. The Government have opened up those at Itabira, and Brazil now has a large output of iron ore as well as of iron and steel. Manganese occurs in the same state, whilst the bulk of the world's monazite (used in the electrical industry) comes from Bahia and other parts of Brazil. The production of diamonds is less important than formerly, though the towns "Diamantina" and "Diamantino," on the east and west of the plateau respectively, attest their widespread occurrence. Brazil is the only world source of high-grade quartz crystal.

The Climates and Natural Vegetation of Brazil. Reference to Figs. 66 and 67 will obviate the need for repetition here. It may be broadly stated that Brazil includes:

(a) The Equatorial Climatic and forest belt of the Amazon Basin and the coastlands as far as Cape St. Roque.

(b) The Tropical Climatic and savana belt of the northern and major portion of the plateau, in which large local differences result from variations in amount of rainfall.

(c) The Warm Temperate Belt stretches across the southern part of the plateau. The natural vegetation is forest, and this belt includes the coffee-growing region of Brazil.

(d) The Temperate Grassland region is just touched in the south, on the borders of Uruguay.

There is, as yet, but little exploitation of the hard timbers of the equatorial forests, but there has been an important development in the exploitation of soft timber from certain regions of the highlands (notably the pines of São Paulo).

Agriculture. Brazil is an agricultural country though only 47,000,000 acres out of a total area of 2,100,000,000 acres—under 2½ per cent.—are cultivated. Three-quarters of the cultivated land lies in the states of São Paulo, and Minas Geraes (the coffee states) and Rio Grande do Sul (the maize-pig-cattle state).

Crop	Acreage (millions)				Yield (thousands of metric tons)			
	1909-13	1924-25	1936-37	1951	1909-13	1924-25	1936-37	1951
Coffee	4.6	5.2	8.7	6.7	795	874	1,577	1,080
Cotton	0.9	1.6	5.4	6.1	181	262	400	349
Cocoa	—	—	0.5	0.7	32	58	127	111
Maize	7.6	6.2	10.5	11.7	3,798	4,182	6,626	6,218
Rice	—	1.3	2.2	4.7	280	728	1,250	3,033
Sugar	—	—	1.2	2.2	—	831	959	1,592
Tobacco	—	0.2	0.3	0.4	—	59	93	118
Rubber (plantation)	—	—	—	—	—	25	17	21

Animals	Millions			
	1912	1920	1932	1952
Cattle	31	34	43	56
Pigs	18	16	22	31
Sheep	11	8	11	16
Goats	10	5	5	8
Horses and mules	9	7	9	10

All these figures suggest that Brazil is an awakening giant with a tremendous potential.

Coffee. Brazil grows more than 70 per cent. of the world's coffee, and the crop averages (post 1945) over a million tons. Nearly half the world's total comes from the state of São Paulo alone, where there are more than three million acres under this crop. The volcanic soils of this region, rich in iron, are peculiarly suited to coffee. Most of the coffee is grown at elevations of 2,500 to 6,000 feet, on the upper slopes of the valleys, cereals occupying their floors. Santos and Rio de Janeiro are the two principal exporting centres.

Cotton. Out of 6,000,000 acres under cotton, the State of São Paulo has the largest share, but output has there fallen owing to soil exhaustion. Here, under climatic conditions approaching those of the United States cotton belt, the annual upland cotton grows well. On the other hand, it is mainly the tree cotton which grows on the hills—between 500 and 2,000 feet—of Pernambuco and Ceara, in the north-east of the plateau region.

Cocoa. Cocoa is, of course, a product of tropical lowlands, and the chief producing areas are shown in Fig. 83 where Bahia produces over 95 per cent. of the total.

Cereals. It will be noticed from the table that the leading cereal is maize, followed by rice. The temperate cereals are unimportant and indeed almost throughout Brazil the principal foodstuff is not a cereal at all but tapioca and cassava. Both these are prepared from the manioc or mandioca, the distribution of which is shown in Fig. 84. Of recent years, however, under United States' influence, the cultivation of the high-yielding hybrid maize has greatly increased acre-yields. Wheat cultivation has been pressed to the extent that output is about half a million tons. Over 3,200,000 tons of rice in 1949 constituted a record to 1951.

Fruits. A recent development, especially near Rio, has been the cultivation and export of oranges. Brazil is now second only to the United States in production and export of oranges, apart from a large output of grapefruit and bananas.

Other foodstuffs include sugar—especially from the coastal tracts

of the east; maté or Paraguay tea, the restricted distribution of which is shown in Fig. 83; haricot beans, tobacco (especially in Bahia), and Brazil nuts. Brazil leads the world in production of castor-beans and is second in cocoa, third in sugar and tobacco.

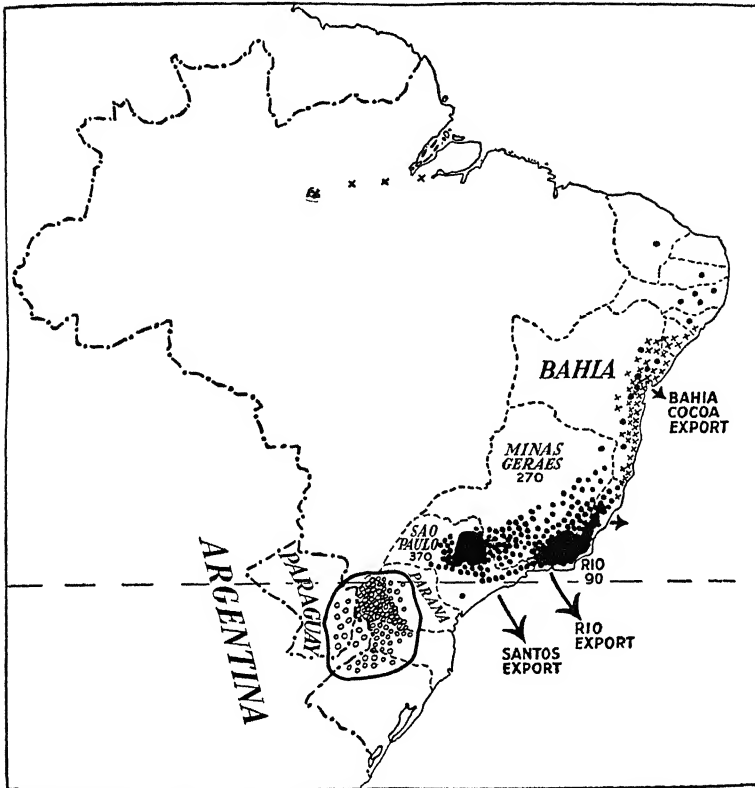


FIG. 83.—The distribution of coffee, cocoa, and maté in Brazil.

Each dot = 1,000 metric tons of coffee; each cross = 1,000 metric tons of cocoa; each circle represents roughly 1,000 metric tons of maté. Coffee is now relatively much less important behind Rio, but more to the west.

Rubber. Though a natural product of the Amazon forests, the declining importance of wild rubber is common to Brazil and all other regions. The best rubber in the world's markets (fine hard Pará) still comes from Brazil. Plantation rubber has some importance near Belem (Pará) and production was stimulated by the Second World War. Brazil is the chief source of Carnaúba wax used for electrical manufacture and gramophone records. Caroa fibre is grown as a substitute for Indian jute and plantations of tung trees yield tung oil.

Cattle and sheep. It is in the natural pasture lands of the south, particularly in the state of Rio Grande do Sul, that cattle—and also sheep—flourish. This state alone has more than a quarter of the cattle and two-thirds of the sheep of Brazil. Conditions are not, however, as favourable as in the pastures of Argentina, largely owing to the fact that lucerne does not flourish. Dried and salted beef works and meat extract factories, therefore, still take a large proportion of the inferior cattle, only the best are suitable for the chilled beef trade.

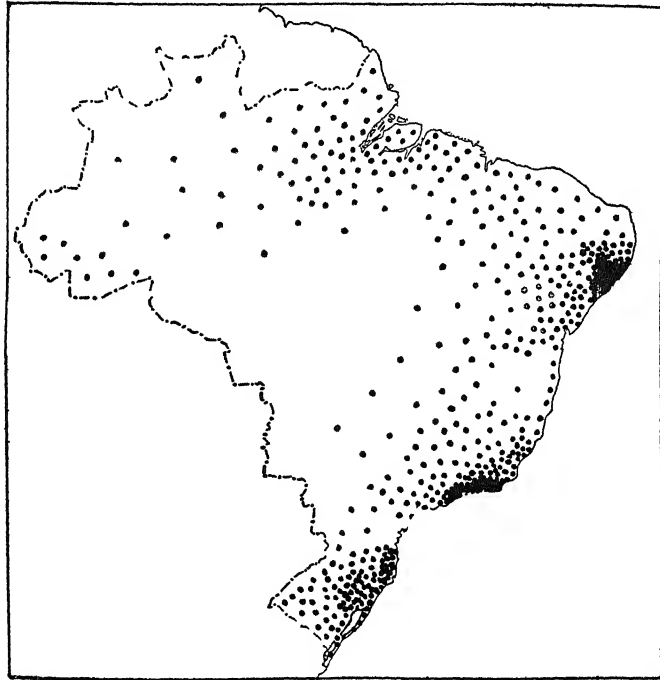


FIG. 84.—The distribution of manioc or mandioca—the principal starchy food—in Brazil.

It is interesting to note that until the First World War, Brazil was a meat-importing country. Temperature is the main factor limiting the sheep more rigidly to the south than the cattle, and land suitable for ranching exists over large areas of the plateau.

Pigs. Pigs assume a greater importance in Brazil than in most countries, except the United States and China. Out of the 30,000,000 in the country, a fifth are in Rio Grande do Sul. As in the United States, maize is used in fattening, and there is a general tendency to specialize in the production of lard. The products, however, both meat and lard, are consumed in the country.

Manufactures. Cotton-weaving is the leading industry, and in 1946 employed 225,000 workers. There are also silk, woollen, and jute mills. The other manufacturing industries are concerned mainly with the preparation of foodstuffs. There are flour mills in Rio, using large quantities of Argentinian and Uruguayan wheat;

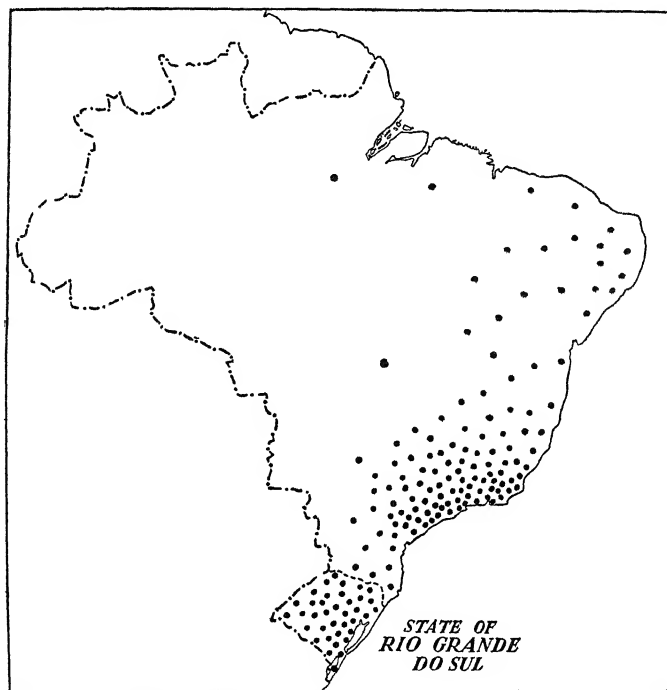


FIG. 85.—The distribution of pigs in Brazil.

Each dot represents 100,000 (= 25,000,000 in 1949). More pigs are now reared north of Rio.

meat-packing is important in the southern states; sugar factories in the north; there are also numerous tobacco works. Timber working is also important and large pulp and paper mills have been established. Brazil is believed to rank fourth amongst the countries of the world in water-power resources but less than 10 per cent. is developed.

Population. In common with other South American countries the population of Brazil is increasing very rapidly as the following census figures show:

1900 . . .	17,318,556	1940 . . .	41,236,315
1920 . . .	30,635,605	1950 . . .	52,645,479

Thus the number of people has trebled in fifty years and the current rate of increase is only a little under 3 per cent. per annum—against

a world rate of less than 1. Nearly 15 per cent. are classed as negroes, 21 per cent. as mulattoes and 63 per cent. as whites. About 5 per cent. of the total population are "foreigners": nearly 300,000 Italians, over 350,000 Portuguese, and large numbers of Spaniards, immigrants from Asiatic Turkey, Germans, Austrians, Uruguayans, and 189,000 Japanese (1941). Japanese immigration ceased in 1941.

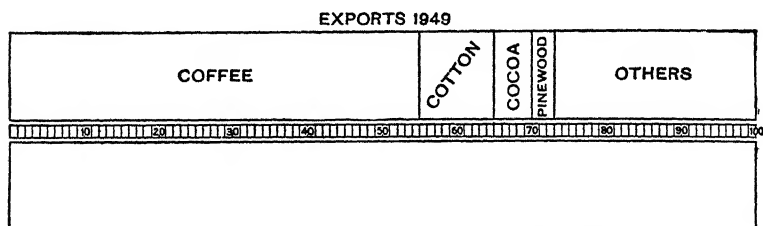


FIG. 86.—The exports of Brazil in a recent year.

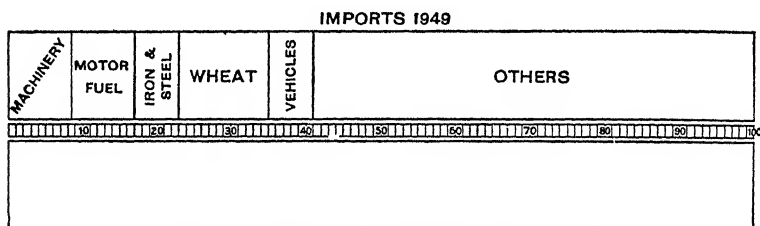


FIG. 87.—The imports of Brazil in a recent year.

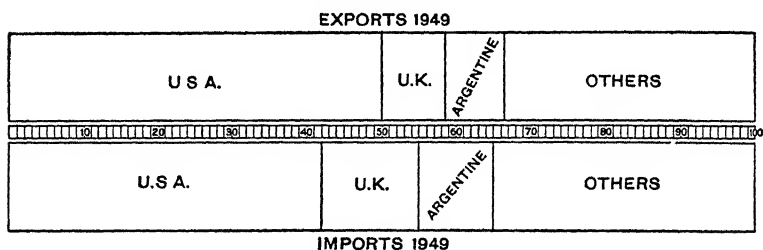


FIG. 88.—The direction of foreign trade in a recent year.

Much of the prosperity of the coffee industry depends upon Italian labour. Many of the foreigners are grouped in prosperous colonies, especially in the southern states. As in the United States, immigration is now on a quota basis and every new settlement must include at least 30 per cent. of Brazilian born. Brazil is a country of great contrasts: the wealthy sophisticated capital Rio de Janeiro has over 2,000,000 inhabitants and so has São Paulo. Yet vast areas of the Amazon are uninhabited.

Communications. Although Brazil, in 1952, had 23,000 miles of

railway, the vastness of the country is reflected in the absence of through railway communication. The railway network serves the coffee regions, the southern states, and the cotton lands, but in the north the Amazon is the great highway. Highways in all the drier areas of Brazil have been greatly extended but it is the aeroplane which has really permitted access to the interior. Over vast areas any modern development would be impossible without airways.

Foreign Trade. The principal exports shown in Fig. 86 demonstrate the amazing predominance of coffee.

The United States absorbs a very large proportion of Brazilian coffee, and this explains the heavy trade between the two countries. The United Kingdom, on the other hand, is a comparatively small customer. The United States and the United Kingdom are both important suppliers of manufactured goods. These trade relationships form an interesting contrast with Argentina, which should be carefully noted.

THE NATURAL REGIONS OF BRAZIL

The Guiana Highlands. The southern slope of the Guiana ancient massif lies in Brazilian territory. The Negro-Branco river system penetrates well into the plateau. There is actually a navigable channel—a natural overflow passage—connecting the Orinoco and the Upper Negro. Tracts of savana separated by strips of forest may, in the future, become cattle pastures, but the region is practically untouched at present.

The Amazon Lowlands. Except for the elevated belt in the west, where the equatorial forest climbs without a break on to the slopes of the Andes (the Montana), the great, practically unbroken, stretch of forest which makes up this natural region lies mainly below the 500 ft. contour line. Some 10 per cent. consists of low-lying alluvial plains subject to periodic flooding (*varzea*); the tracts lying above the reach of floods being known as *terra firme*, and it is on bluffs of the latter that such towns and settlements as do exist have been built. The natural region may be considered as bounded on the north and south by the outcrops of older rocks of the Guiana highlands and the Brazilian massif. Communication is almost entirely by river, as already mentioned above. The life and commerce of the region are concentrated at the few ports along these main lines of communication—especially at Belem (Pará) and Manáos. Belem is the natural outlet of the whole basin; Manáos has a well-selected central position. The Peruvian port of Iquitos is the collecting centre for the extreme west of the basin. Manáos is the rubber-collecting centre, but the importance of wild rubber in the world's supplies has steadily decreased. Plantations near Pará have not proved very successful:

labour is one difficulty. The collecting of Brazil nuts is an industry of some little importance, but as yet the timber resources of the area are almost untouched. The Amazon basin is very thinly inhabited.

The Brazilian Plateau. The Brazilian Plateau north of the Warm Temperate Forest belt—that is north of about 20° S.—enjoys a

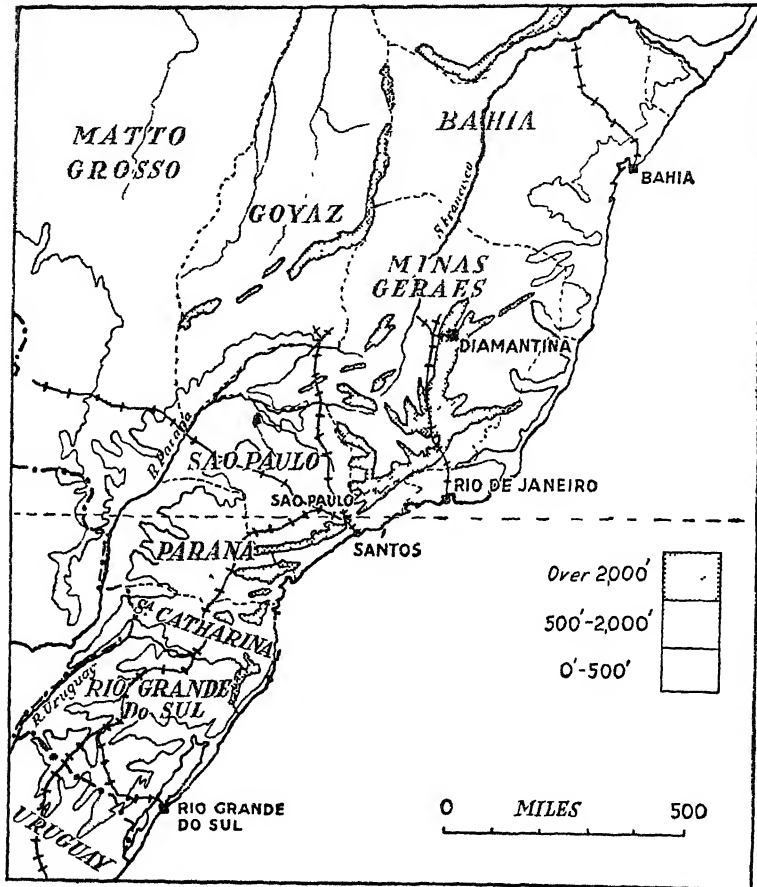


FIG. 89.—Southern Brazil.

Notice the coastal range which protects the coffee lands from the trade winds.

NOTE.—There is an important main railway from São Paulo to Rio.

The pecked line is the Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S.).

tropical climate, and can, therefore, be regarded as distinct from the portion of the plateau lying farther south. Over the vast mass of the interior the vegetation is of the savana type; in the north-east of Brazil this gives place to a dry type of vegetation with thorny succulent plants and known as the “caatingas” of Brazil, whilst along

the coast there is a strip of forest. Being one of the old land masses of the world, the plateau has been deeply cut into by the river systems, and the most marked mountainous tract is the eastern edge of the plateau. The slow development of the interior, contained mainly within the confines of the States of Goyaz and Matto Grosso, is due in the main to its remoteness. But the Brazilians have boldly built their new capital, Brazilia, here—600 miles from the coast, access is mainly by air, occupied 1960. Gold and diamonds are worked in the southern part of Matto Grosso, but the main industry is the rearing of cattle—not, however, of very good quality.

The most important mineraliferous zone lies in the State of Minas Geraes and neighbouring parts of the east central part of the plateau. Here lie the richest reserves of high-grade iron ore known, probably, in the world; there are vast reserves of manganese, whilst gold and diamond mining are both carried on. The monazite of Brazil comes from the shores of Bahia State. Cattle-rearing is also important, and agriculture has assumed an increasing importance in recent years. The southern part of Minas Geraes (which is an extension of the rich ground of São Paulo) grows maize, rice, beans, mandioca, coffee, tobacco, sugar, and cotton, as well as vegetables for the coast towns.

Most of the north-east of the Brazilian plateau suffers from a deficient rainfall. Only along the coastal strip from Cape St. Roque southwards, and in a few of the more exposed heights, does it exceed 40 inches. Cattle and goat rearing are staple industries, cotton is an important crop. Sugar, cocoa, coffee, and rice are crops belonging to the coastal strip; wax derived from the carnaúba palm is a product of the drier parts. The trade of the north-eastern part of the plateau is mainly through the ports of São Salvador (Bahia), Recife (Pernambuco) and São Luiz. The mining districts are served especially by the capital, Rio de Janeiro.

The Southern Forest Region. Stretching across the southern extension of the Brazilian plateau, roughly between latitudes 20° S. and 28°, is a belt of forest. It is separated from the quebracho forests of the Chaco by the Paraguay River, and is different in character, though both are linked together in Fig. 66. This forest is the natural home of the maté-producing tree (*Ilex paraguayensis*). In the eastern part, pines (*Araucaria*) are important in the forest as a source of soft timber. In the north-eastern part of this forest region, mainly in the State of São Paulo, lies the great coffee region of Brazil. Other crops flourish on the rich iron-bearing soils—sugar, rice, beans, and cotton may be mentioned—and stock-raising is important. Maize is a great crop along the coastal strip. The coffee region is well served by a network of railways, centring on the town of São Paulo, and the port of Santos. Manufactures are concentrated in the towns of São Paulo and Rio.

The Grasslands of Southern Brazil. The grasslands correspond roughly with the State of Rio Grande do Sul and extend southwards to include Uruguay. The rainfall is heavier than on the grasslands of Argentina. The vast natural pastures support great numbers of cattle and sheep; as already mentioned, Rio Grande has two-thirds of the sheep and a quarter of the cattle of the whole of Brazil. Maize is the great cereal, but rice is extensively cultivated along the coastal strip where broad lowlands with lagoons are found. Much fruit, including grapes, is grown in the southern part of Brazil. The trade is concentrated in Rio Grande.

CHILE

Position and Size. The Republic of Chile has an area of roughly 290,000 square miles, and a total population of over 6,000,000 (estimated 1954). Nearly 50 per cent. of the population is urban. The majority of the inhabitants are of European origin; the indigenous population comprises the Fuegians of the south, the Araucans who live in the valleys on the western slopes of the Andes, and the Changos of the northern coast. Chile declared herself independent of Spain in 1810. 2,500 miles from north to south, Chile is nowhere more than 200 miles from east to west and is generally much narrower.

Physical Features and Geology. Broadly speaking, Chile occupies the narrow strip between the crest of the Andes and the Pacific Ocean. More especially in the south there is a clearly marked threefold division into the Andes, the Longitudinal Valley, and the Coastal Range. The Longitudinal Valley varies in width from nothing up to 30 or 40 miles, but it is broken up by small cross ridges. In the south it sinks to below sea-level and its place is therefore taken by arms of the Pacific Ocean.

In the north, permanent rivers are few; they lose themselves in the desert before reaching the coast; in the south they are checked by the Coastal Range and have piled up a thick mass of sediment so that the level of the Longitudinal Valley is steadily being raised.

The wealth of Chile consists chiefly in its minerals, which fall broadly into four groups:

(a) The nitrate deposits of the desert regions of the north, producing annually between 1 and 2 million tons.

(b) The metallic minerals, found mainly in the northern provinces, including gold, silver, copper (Chile is one of the world's largest producers of copper), iron, manganese, and cobalt.

(c) The coalfields found to the south of Valparaiso (production about 2,500,000 tons).

(d) Oil was discovered in 1945 in the Magallanes but only small quantities have been obtained.

The Climate and Natural Vegetation of Chile. Reference to Fig. 66 will show that, apart from a strip of the high Andine region with an "Alpine" climate, Chile falls into three climatic vegetation regions. There is the Hot Desert in the north, passing around Valparaiso into the small but important Mediterranean region, and then into the Cool Temperate Oceanic region in the south. Chile includes also small areas of the temperate sheep-rearing country of Patagonia and Tierra del Fuego, described under Argentina.

The extensive natural forests of the south are not at present much exploited. The Chilean pine is one of the most valued trees, and grows mainly on the mountain zone up to 5,000 feet. Elsewhere the Southern Beech is often the principal tree.

Agriculture. The total area of arable land is about 8,000,000 acres, together with 40,000,000 acres of meadows and pasture. Most of this is found in the Mediterranean belt, which is, indeed, often referred to as the "agricultural zone" in contrast to the arid zone in the north and the forest zone in the south. In the agricultural belt Chile produces large quantities of cereals, fruit, and vegetables, as well as excellent wine. There is naturally inter-state trade in that the agricultural belt supports the mining community of the arid north. Chile has 2,000,000 cattle, 6,000,000 sheep, and large numbers of goats and pigs, and dairy farming is increasing.

Communications. Formerly the only means of communication between the north and south of Chile was by means of the sea. Later a state-owned railway line was completed throughout practically the whole length of Chile, though the sea remains the most important highway between the agricultural and mining belts. Along the northern coast there is a string of nitrate ports, all of

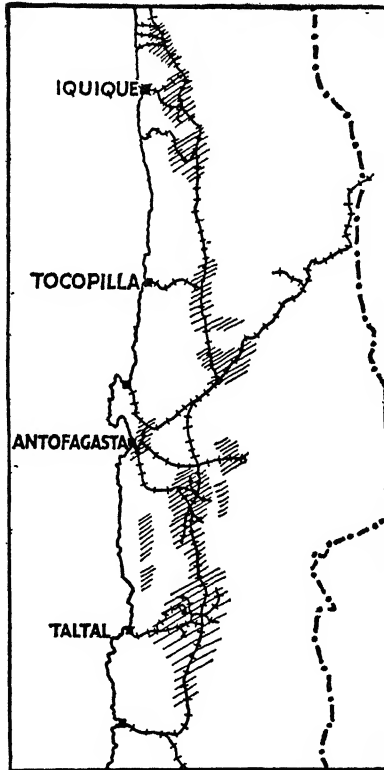


FIG. 90.—The nitrate fields of Chile.
The nitrate fields are shaded, the chief railways
and nitrate ports are shown.

which suffer from the lack of natural harbours, and are only open roadsteads. The more important, Arica and Antofagasta, are railway terminals serving as outlets, not only for the nitrate fields and mining districts of Chile, but also for the Bolivian plateau beyond. The ports of the central and southern regions also have indifferent

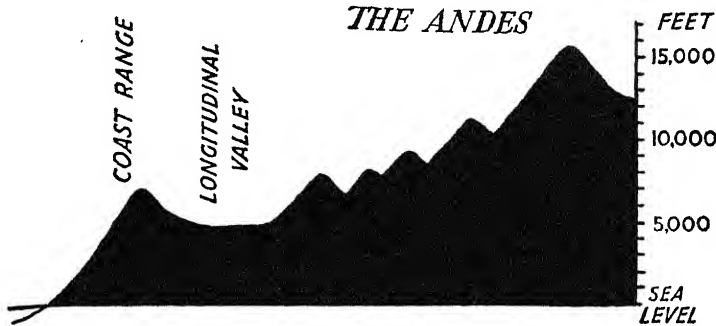


FIG. 93.—Section across Central Chile.

harbours, though Valparaíso and San Antonio have been modernized. The railway system suffers from a multiplicity of gauges—five different ones are in use—the legacy of the days when the system consisted of numerous privately owned lines running inland from the various ports.

Foreign Trade. Nitrate and copper are the mainstays of Chilean

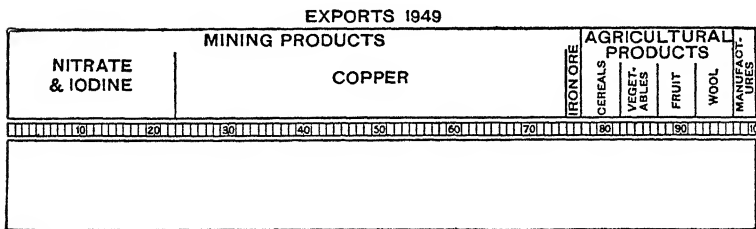


FIG. 94.—The exports of Chile in a recent year.

Chile has almost a monopoly of the world supply of natural nitrates.

prosperity, as shown in Fig. 94. The once-feared exhaustion of the nitrate deposits has been alleviated by the discovery of vast new fields, but the demand abroad for nitrate is menaced by the supplies of artificial fertilizer. However, the increased use of fertilizer allows the absorption of supplies from both sources. The principal imports show that Chile is self-supporting in the matter of foodstuffs except tea and sugar. The chief customers for Chile's nitrate

heavier on the coast and coastal range than in the great valley (compare Valparaiso 20 inches, Santiago 14 inches). Valparaiso has a typical winter rainfall, but southwards the length of the rainy season gradually increases together with the total amount. Scattered forests of beech, laurel, and cypress appear in the Mediterranean belt, but the original vegetation has been largely cleared. The close similarity between the Mediterranean belt of Chile and California should be noted. The principal coalfields lie to the south of the Mediterranean region between Arauco and Concepción and around Lebu.

The Forest Belt. On the whole, southern Chile is little developed. The valuable timber—the Chilean pine—has been removed from the more accessible regions, and although efforts are being made to promote scientific forestry, the pine is a slow-growing tree. Chile figures at present as a timber-importing country. The rainfall along the coastal range is very heavy—exceeding 200 inches. Even at the important town of Valdivia, on the coast, it is 107 inches, with a marked winter maximum.

BOLIVIA

Bolivia is a large but backward state, consisting of two regions:

(a) The western region, a great plateau of an elevation of 12,000 feet with an inland drainage into Lake Titicaca. This plateau is rich in minerals, especially tin and silver, but only those born in the country can work for extended periods at such a great height above sea-level. The minerals have to be exported through the ports of Mollendo in Peru, or Arica and Antofagasta in Chile.

(b) The eastern region, sloping down to the valleys of the Amazon Basin, has the climate and natural resources of the Amazon Basin, except that they are slightly modified by the greater elevation. The region is known as the Montana. Its natural outlet is through Brazil by river, or through the Argentine by railway.

La Paz, on the plateau, is the principal town of Bolivia and the seat of government though Sucre is the legal capital.

PERU

Like Bolivia, Peru consists of part of the Andine tableland and the Montana. Peru, however, has the advantage of possessing a strip of the Pacific coastal plain.

Although it is a desert, the coastal strip is the most important region of Peru. Irrigation can be practised there, and the production of sugar and cotton is increasing. *Lima*, the capital, is in this

belt, and *Callao* is the great port. *Mollendo*, to the south, is the port for Bolivia. As in Bolivia, the Andine Region is rich in minerals (copper and silver), and in this region the llama is valued as a transport animal and for its wool, whilst the alpaca yields valuable wool. The Montana Region is still undeveloped.

ECUADOR

Ecuador falls within the same three natural regions as Peru, but here the coastal strip receives a good rainfall and the production of cocoa is important. Quito, the capital, is almost on the equator, but is at a height of 9,000 feet above sea-level, and has an average temperature of only 55.5° , with an extraordinarily small annual range, less than 1° .

COLOMBIA

Colombia is at the northern end of the main chain of the Andes and there the mountains have split into four branches. The natural regions into which the country can be divided are as follows:

(a) The lowlands of the coast and the main valleys between the Andine chains. The most important valleys are those of the Magdalena and Cauca. The climate is equatorial, with the usual products such as cocoa, sugar, cotton, and bananas. *Bogotá*, the capital and main centre of population, is on the plateau near the Magdalena Valley.

(b) The mountain spurs. The slopes, between 3,000 and 7,000 feet, produce coffee and maize, and the former is exported to the United States; higher up wheat and other grains are grown for home use, but lands above 10,000 feet are uninhabited. Colombia is second only to Brazil in production of coffee.

The minerals of the mountain regions are probably valuable, and important oilfields have been developed near the coast. The Magdalena and Cauca are the great highways, and much of the export trade is through the ports of Cartagena and Puerto Colombia (Barranquilla), though Buenaventura is now the chief port.

VENEZUELA

Venezuela falls into four natural regions:

(a) The northern coastal lowlands, where the oilfields of the Maracaibo Basin are very important. Venezuela has long been second only to the United States in production of oil. Cocoa and sugar are produced.

(b) The mountain spur from the Andes, and its production of coffee and maize.

(c) The llanos or grassy plains of the Orinoco Basin, devoted largely to cattle.

(d) The little developed Guiana highlands.

Caracas, the capital, is connected with its port, *La Guaira*, by an excellent modern road and a railway, and other towns are growing in importance.

GUIANA

Guiana consists of an undeveloped upland in the south, rich in minerals, and a tropical lowland in the north. It is divided into British, Dutch, and French Guiana, each colony centring around a small river basin. Gold and diamonds are the most important products of the highlands, whilst sugar, rice, and cocoa are produced in the lowlands. Georgetown, the capital of British Guiana, is near the mouth of the Essequibo. British and Dutch Guiana (the latter more usually called Surinam) are the world's largest sources of supply of bauxite, for the production of aluminium.

Trinidad, though mentioned above as one of the British West Indies, is essentially a South American island near the mouth of the Orinoco River.

EXERCISES

1. Agriculture in Argentina. Complete the table from the *Statesman's Year Book*.
2. Agriculture in Brazil. Complete the table from the *Statesman's Year Book*.
3. The foreign trade diagrams. These may be completed from the *Statesman's Year Book*.

EXAMINATION QUESTIONS

1. Write a geographical description of Brazil, noting specially those features that have led and may lead to economic expansion.
2. What do you understand by the term "Mediterranean Climate"? Discuss the application of the term to climatic conditions in South America.
3. Give an account of the climates and products of Peru.
4. Give an account of the mineral products of South America.
5. Give a brief account of the foreign trade of Argentina.
6. Contrast the climates of Chile and Argentina and say how far the contrast can be traced to the influence of the Andine Chain.
7. Consider the main geographical impediments that lie in the way of the economic development of the Amazon Basin.
8. Write a description of *either* the Rocky Mountain system *or* the South American Cordillera.

CHAPTER III

AFRICA

GENERAL CONSIDERATIONS

Position and Size. With an area of 11,000,000 square miles, Africa is the second largest continent, being next to Asia in size. Although three times the size of Europe, the coastline of Africa

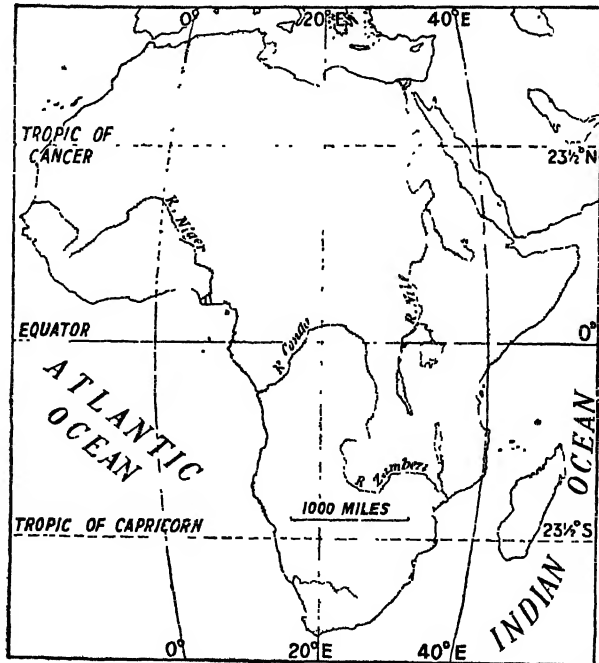


FIG. 97.—The position and size of Africa.

is only 19,000 miles long—shorter than that of Europe. Much of the continent is far from the ocean, for there are few deep bays or gulfs. Africa is the only continent which is almost cut in half by the equator. Rather more lies to the north of the equator than to the south, but the north and south coasts are almost exactly equal distances from the equator. The position of the two Tropics and the meridian of 20° E. should be noted.

Physical Features. Except for the Atlas Mountains in the north-west, which really belong to the European Alpine system of folded mountains, the whole of Africa is occupied by a plateau with only a narrow coastal plain separating the plateau from the encircling oceans. Sometimes, however, as in South Africa, there are several "steps" on to the plateau. As shown in Fig. 98, the African plateau is higher in the south than in the north. The higher portion of the plateau stretches nearly as far north as the equator, and is then

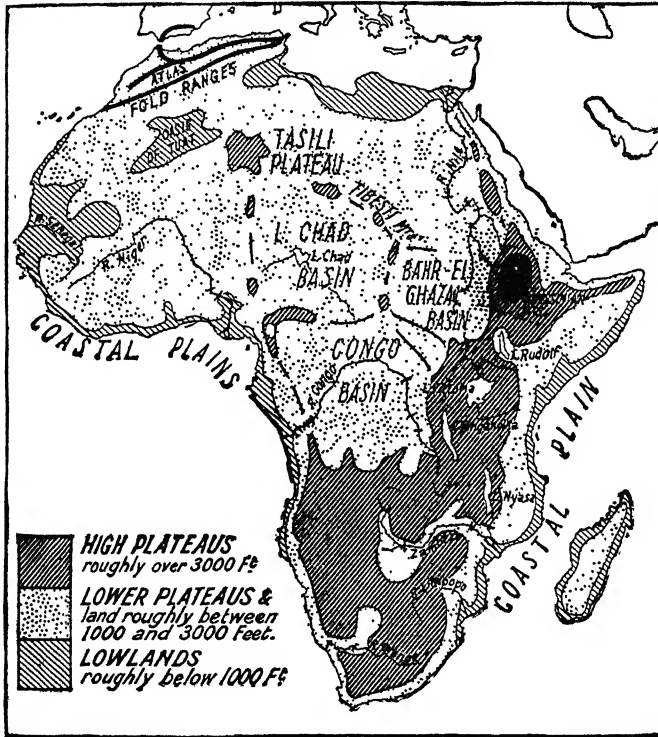


FIG. 98.—The main physical features of Africa.

deeply cut into by the basins of the Congo, Nile, and Lake Chad, so that the high plateau, as it were, sends branches northwards, separating the river basins. The broadest branch is the eastern one, on which are situated the well-known lakes of East Africa. It is on the surface of this part of the plateau and in Abyssinia that old volcanoes have built up a series of lofty cones. In South Africa the high south-eastern edge of the plateau, well over 6,000 feet, forms the Drakensberg Range.

Rivers. The nature of the African rivers is determined largely by the plateau character of the continent. Most of them have a long, navigable, upper course on the surface of the plateau, and then they descend rapidly to the coastal plain by a series of rapids and waterfalls. The bars across the rivers in Fig. 98 indicate the position of the principal rapids or falls. It follows that few of the rivers are navigable far inland from the coast, and this was one of the factors which hindered the exploration of the erstwhile "Dark Continent." The discovery of the navigable upper courses has facilitated later exploration and development. In some cases the falls and rapids are more widely separated, and the rivers descend from the plateau in a series of steps. This is particularly the case with the Nile. The most important rivers of Africa are the Nile, which flows northwards into the Mediterranean Sea; the Senegal, Niger, Congo, and Orange draining into the Atlantic Ocean; and the Limpopo and Zambezi flowing into the Indian Ocean.

Lakes. The lakes on the East African plateau are arranged along two main lines, which are believed by some to represent two great rift valleys. Lakes Albert, Edward, and Tanganyika lie along the western line; Lakes Rudolf and Nyasa along the eastern line; Lake Victoria on the plateau. To the south of the Sahara lies Lake Chad, the centre of a region of inland drainage.

Climate. Africa lies both to the north and to the south of the equator, and care is therefore necessary in referring to "summer" or "winter" conditions.

Conditions from November to April. During this half of the year the southward swing of the wind systems results in summer conditions in South Africa. Owing, however, to its elevation the plateau remains comparatively cool, as shown in Fig. 99, and only the plains of the Guinea Coast and East African Coast together with parts of the Congo basin have an average temperature of over 80° in January. At the same time, as shown in Fig. 100, the wind belts swing southwards, and the belt of greatest rainfall lies south of the equator. At this season also the northern coasts come under the influence of the westerly winds and receive the usual winter rainfall of Mediterranean lands.

Conditions from May to October. The northward swing of the wind systems results in the belt of tropical rainfall lying north of the equator (Fig. 101) and the south-western coasts coming under the influence of the westerlies (giving a winter rainfall). At this season the Sahara becomes extremely hot (Fig. 102), but the South African plateau is cooler owing to its altitude.

Climatic Regions. The climates of Africa are arranged so that the same types of climate are found to the north of the equator as to the south.

(a) *The Equatorial Climate* is found along the equator, especially

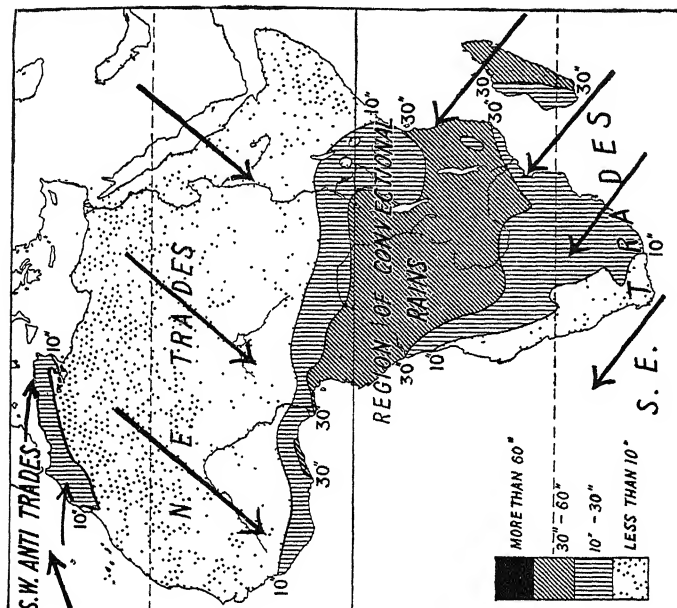


FIG. 100.—Climate: rainfall and winds, November to April.

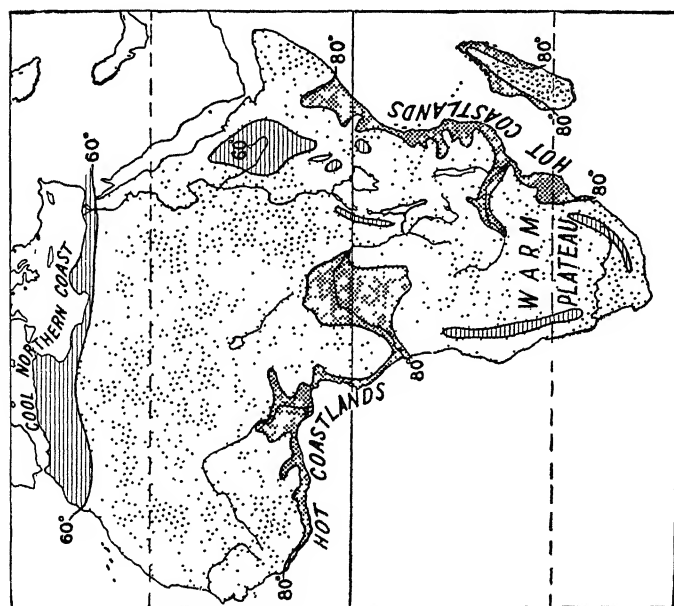


FIG. 99.—Climate: average surface temperatures in January.

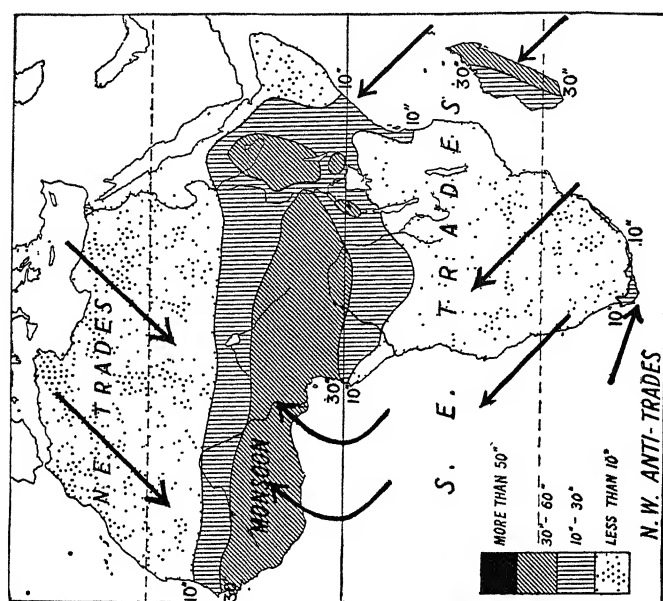


FIG. 102.—Climate: rainfall and winds, May to October.

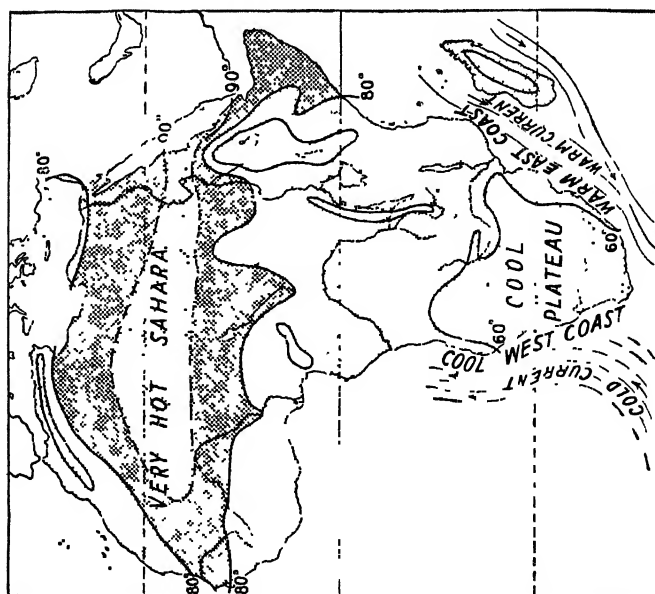


FIG. 101.—Climate: average surface temperatures in July.

in the Basin of the Congo, and along the low coastlands of the Gulf of Guinea.

(b) *The Tropical Climate*, with summer rain, is found both to the north and south of the equator. So characteristic of Africa is this climate that it is from Africa that it derives the name of the "Sudan type."

(c) *The Hot Desert Climate* is found along the high-pressure belts both in the north and in the south. In the north it stretches

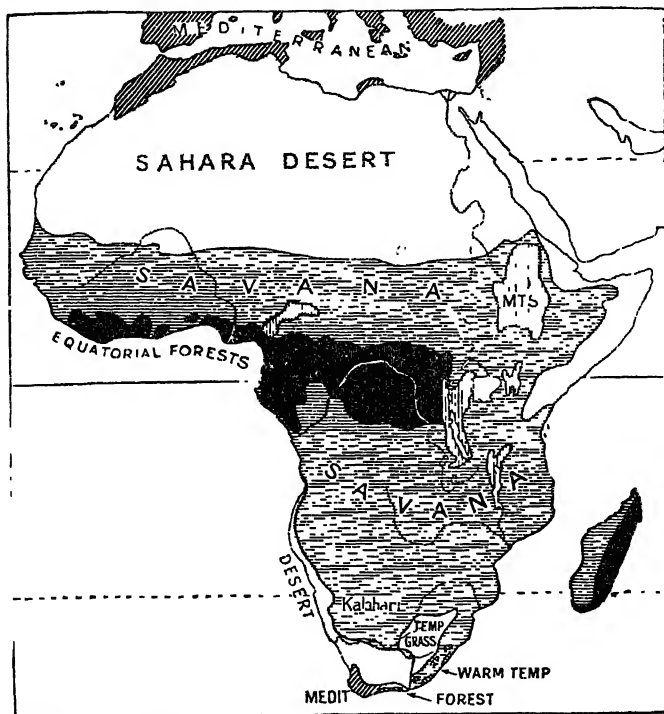


FIG. 103.—The natural vegetation of Africa

right across the continent, but in the south it is found only on the west of the continent. There the east side receives moisture from the Trade Winds blowing across the Indian Ocean.

(d) *The Mediterranean Climate* is found both along the north-west and the south-west coasts.

(e) *The Warm Temperate Oceanic and Temperate Continental Climates* are found, owing to topography, only in the south.

Natural Vegetation. As shown in Fig. 103, the vegetation regions of Africa correspond closely with the climatic regions.

Population. In Africa it is very clearly shown that a great desert

can act as a barrier to mankind. North of the Sahara the people are Moors, Arabs, and Egyptians—closely allied to the peoples of Southern Europe. But Africa, south of the Sahara, is inhabited almost entirely by the woolly-haired, black-skinned negroid peoples—including the true negroes and the Bantu. In the less accessible and less hospitable parts of the continent, there are small groups of very backward, uncivilized peoples. They

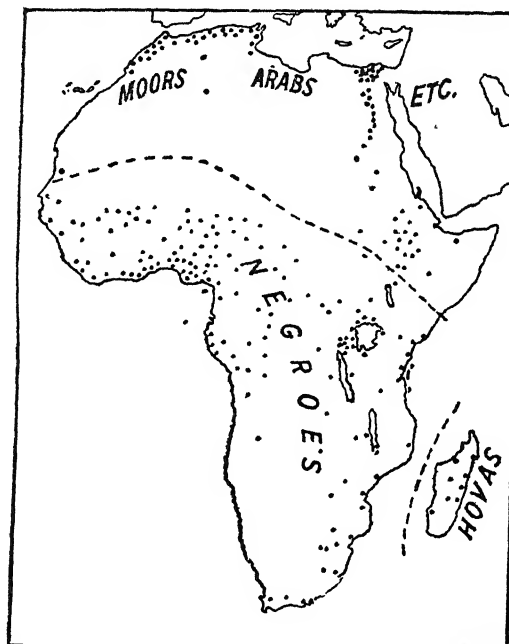


FIG. 104.—The population of Africa.
Each dot represents 500,000 people.

have been forced into the worst parts of the continent, and include such groups as the Pygmies of the Congo forests and the Bushmen of the borders of the Kalahari Desert. Africa as a whole is not very thickly populated and there is plenty of room for further settlement and development in many areas when the control of water and management of tropical soils are better understood.

SOUTH AFRICA

“South Africa” occupies the bulk of the southern part of the continent. Nearly the whole, excepting parts of Bechuanaland and South-West Africa, lies outside the Tropics. This vast area comprises three main political divisions:

1. The Union of South Africa (Unie van Zuid Afrika) is defined as "a sovereign independent state" within the British Commonwealth of Nations, and was formed in 1910 by the union of the Cape of Good Hope, Natal, the Orange Free State, and the Transvaal.

2. Included under the Administration of the Union is South-West Africa (formerly German South-West Africa) which was mandated by the old League of Nations.

3. The three separate countries of Basutoland, Bechuanaland, and Swaziland are at present British Territories under a High Commissioner appointed from London; hence the term High Commission Territories. Basutoland is a colony surrounded by Union territory; Swaziland a protectorate forming a "bite" out of the Transvaal where it borders Portuguese East Africa; Bechuanaland a protectorate extending north of the Union to the borders of Rhodesia.

On the east the Transvaal is cut off from the Indian Ocean by the territory of Portuguese East Africa; on the west there is a large stretch of very dry country, the Kalahari semi-desert. In the main, therefore, the outlet of the whole of British South Africa is towards the south.

The following table is given for reference purposes:

	Area in sq. miles	Population (1951)		
		European	Non-European	Total
Union of South Africa (four provinces) . . .	472,733	2,643,187	10,003,188	12,646,375
Cape of Good Hope . .	278,839	935,674	3,481,656	4,417,330
Orange Free State . .	49,866	227,587	790,620	1,018,207
Transvaal	110,450	1,205,458	3,596,947	4,802,405
Natal	33,578	274,468	2,133,965	2,408,433
South-West Africa . .	317,725	48,548	358,968	407,516
Basutoland ¹	11,716	1,678	562,174	563,852
Bechuanaland Protec- torate ¹	275,000	2,325	294,558	296,883
Swaziland ¹	6,705	3,204	182,010	185,214

¹ 1946

Physical Features. The great African plateau is highest in the south, that is, in South Africa. Here the greatest heights are reached along the south-eastern edge, and the surface of the plateau slopes downward, on the whole, towards the north and west. It will be obvious that South Africa is at once divisible into two parts:

1. The interior plateau.
2. The country between the escarpment or edge of the plateau and the sea.

The *Interior Plateau* is a region of great plains. The surface is sometimes almost flat, at other times gently rolling, whilst sometimes low, flat-topped hills rise from its surface. The surface is, on the whole, saucer-shaped with the western rim of the saucer lower than the southern and eastern. Except in the centre, nearly the whole is more than 4,000 feet above sea-level. The escarpment receives various names: in the Transvaal it is known as the Drakensberg; farther south, where it forms the boundary between the Orange

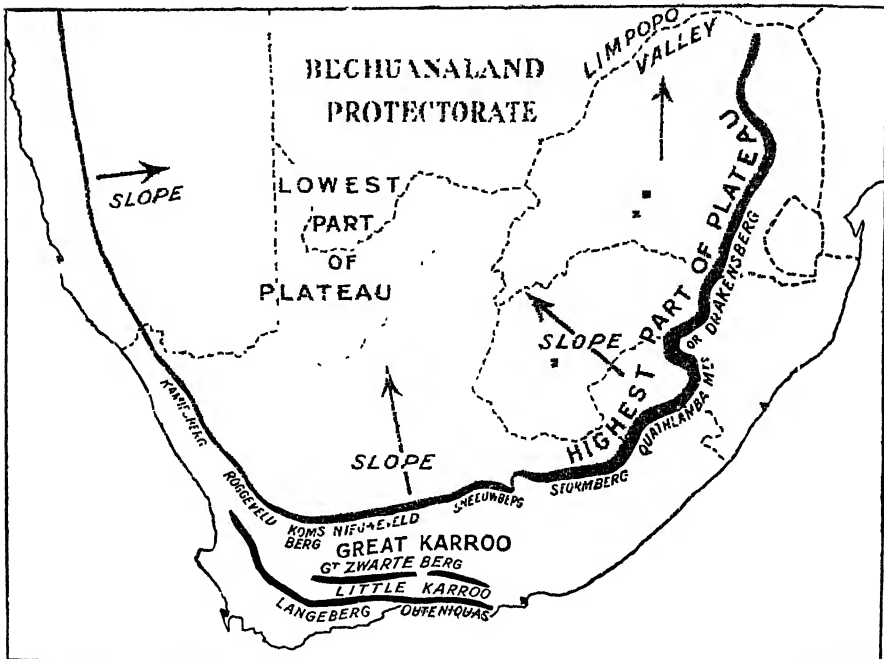


FIG. 105.—The physical features of South Africa.

Note carefully the position of the great escarpment and the high plateau of which it is the boundary.

Free State and Basutoland on the one side and Natal on the other, it is known either as the Drakensberg or the Quathlamba Mountains. Then the edge turns westwards and runs through the Cape Province as the Stormberg, Sneeuwberg, Nieuweveld, Komsberg, Roggeveld, and Kamiesberg. The lower western edge through South-West Africa has various names. Fig. 105 shows that most of the Transvaal lies on the plateau, and so do the whole of the Free State and Basutoland. More than one-third of the Cape Province is on the plateau; Bechuanaland, with the Kalahari Desert, occupies the lower part of the saucer. The highest points of the south-eastern edge reach 11,000 feet (Giant's Castle).

The plateau is drained, as one would expect, by rivers which rise near its high south-eastern or eastern edge and have a long course to the west to the Atlantic Ocean. Except for the northern part of the Transvaal all the interior plateau of the Union (including most of South-West Africa) lies in the basin of the Orange River, with its two chief tributaries, the Caledon and the Vaal. The rainier part of the plateau being the east, the rivers there usually have some water in them, but in the west the Orange River flows

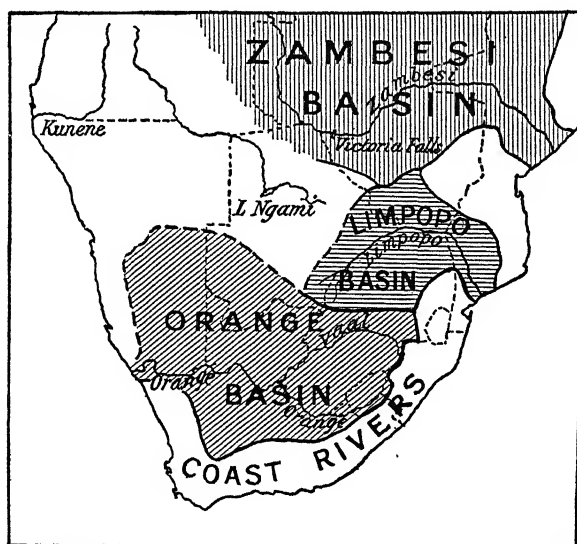


FIG. 106.—The rivers and river basins of South Africa.

through very dry country and receives no important tributaries. This part, in the dry season, may be only a succession of pools. About 300 miles from the ocean the Orange River commences its descent from the plateau in the Aughrabies Falls. The northern part of the Transvaal is drained by the tributaries of the Limpopo River, the Limpopo itself forming the boundary between the Transvaal and Southern Rhodesia for a considerable distance, and then breaking through the eastern escarpment and emptying itself into the Indian Ocean. Neither the Limpopo nor the Orange River is of any importance as a highway, and though the Orange River runs through very dry country for much of its course, its value for irrigation purposes is minimized by the fact that the river flows between steep high banks considerably below the general land level. Many of the South African rivers are liable to sudden floods, and a great trouble to farmers in the Union is the formation of deep "dongas"

or gullies; the rain when it falls drains rapidly away along these dongas instead of moistening and enriching the surface soil. There are no large lakes in South Africa, but scattered over the surface of the plateau are large numbers of shallow hollows known as pans or vleis. It is believed that the loose sand or soil which once covered these areas has been blown away by the action of wind, leaving hollows which may be covered by water after heavy rain. Many of the pans when dry are covered with deposits of salt.

The Country between the Plateau and the Sea. This tract is not a coastal plain. In the south-west there are numerous fold mountains separated by fertile valleys; in the south there are, as shown in Fig. 107, a number of "steps" up to the surface of the plateau from the coast. The lowest "step" is the narrow coastal plain or coastal plateau—it is often several hundred feet above

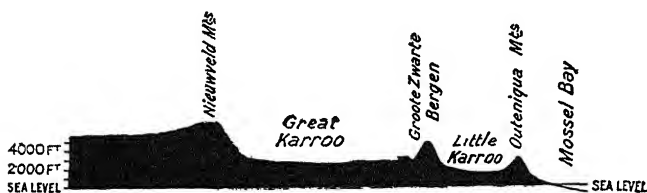


FIG. 107.—Section from the High Veld to the South Coast.

sea-level. Then comes a range of mountains—the Langeberg and Outeniquas—and then the second step, a dry plateau known as the Little Karroo. On the north the Groote Zwarte Bergen separate the Little Karroo from the third step, the plateau of the Great Karroo. Most of the country which lies between the great escarpment and the ocean is drained by rivers which rise at the foot of the escarpment or amongst the fold mountains themselves. The Natal rivers flow swiftly in deep valleys, and waterfalls are frequent. Rivers rising amongst the fold mountains of the Cape of Good Hope tend to flow along the valleys between the ranges as far as possible, and then to cut through them by a series of great "poorts." Some of the rivers, such as the Great Fish River and Sundays River are important for irrigation purposes.

Geology. The plateau of South Africa consists of a foundation of very old, hard rocks, which were folded very early in the earth's history, and were afterwards covered by great sheets of sandstone and shale, known as the Karroo System. These beds are, in large part, of freshwater origin, and in some areas contain valuable seams of coal. The Karroo Beds where they rest on the ancient massif are still nearly horizontal and are penetrated by great sheets—also horizontal—of an igneous rock known as dolerite. These masses

of dolerite are harder than the sandstones, and so form the flat tops to the hills when the softer sandstones are worn away. Where the flat-topped tablelands have been dissected by weathering, the characteristic conical hills, known as kops or kopjes, result. In the east of the plateau there are sheets of lava poured out at the same time as the Karroo Beds were laid down. The plateau has not been folded by earth movements since the Karroo Beds were laid down, but has been raised up by gradual elevation to its present height. At the same time the Karroo Beds have been removed by denudation over large areas and the ancient rocks exposed as in the gold-bearing Witwatersrand and over much of Bechuanaland.

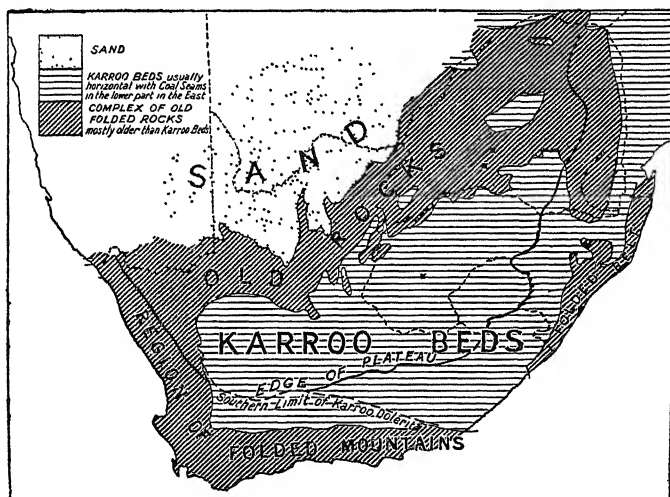


FIG. 108.—Simple geological map of South Africa.

The country between the escarpment and the ocean is different, mainly because it has been folded since the deposition of the Karroo Beds. In the south-west many of the folded mountains in the Cape Ranges consist of the hard Table Mountain Sandstone.

Minerals. South Africa was formerly almost the only source of diamonds, and produces about half the world's total annual output of gold, so that the mineral industry is a very important one.

Gold. Gold was known to occur in South Africa in ancient times, but the Witwatersrand, the richest goldfield in the world, was not discovered until 1885. From that time to the end of 1954, the Transvaal has produced gold valued at about £3,500,000,000. It is nearly all found in curious beds of rock, a few feet thick, called "bankets." The rock is a hard conglomerate or puddingstone with pebbles of quartz, and the particles of gold are so small that they can rarely be seen by the naked eye. The banket is a very old rock,

and is part of the area of old rocks which has been uncovered by the wearing away of the Karroo Beds. In recent years vast new gold-fields have been opened up in the O.F.S.

The annual production is 12 million fine ounces, about 350 tons, obtained by crushing some 35–40 million tons of rock. The industry employs over 300,000 people.

The whole economic structure of the Union has been built up on the basis of gold production, and this is a dangerous position.

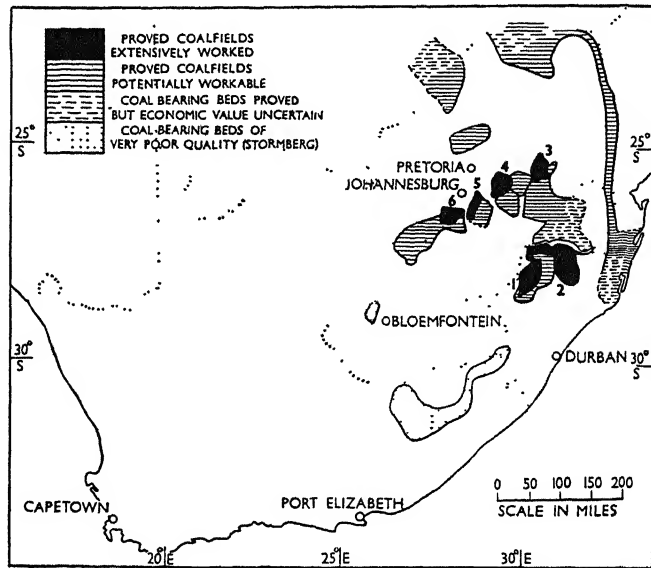


FIG. 109.—The coalfields of the Union.

There is little doubt that increased attention will have to be focused on the base metals and agriculture if the Union is to maintain its present level of prosperity.

Diamonds. The most famous diamond field is at Kimberley, in Cape Province, where diamonds were first found in 1871, but the largest single mine was the Premier Diamond Mine, near Pretoria. The earliest diamonds found were alluvial—that is, they had been washed out of the parent rocks. The Kimberley diamonds were found in decomposed rock known as yellow ground, occupying oval or circular patches corresponding to “pans” on the surface. Underneath the decomposed yellow rock is hard rock known as “blue ground” and the momentous discovery of the diamond

industry was the realization that the blue ground was the parent rock of the diamonds. The blue ground, scientifically known as Kimberlite, is an igneous rock, occupying pipes going down into the earth's crust which may represent old volcanic necks. Large numbers of pipes are known, but only a few are diamond-bearing. In the early days the pipes were excavated to depths of as much as 400 feet, before underground mining became necessary. The deep diamond mining is in the hands of a few large companies such as De Beers, Jagersfontein, and Premier, which restrict and control the output, and the principal mines are near Kimberley, at Jagersfontein, Koffiefontein, and near Pretoria. In the years 1925-27 new discoveries of richly diamond-bearing alluvial deposits were made, especially in South-West Africa, resulting in a huge increase in the output of alluvial stones and temporary cessation of mining



FIG. 110.—Section across South Africa.

in South Africa. Mining ceased during the Second World War but production has since risen to over 2,000,000 carats. Though output of diamonds has been restricted to maintain prices South Africa easily leads the world in value of production.

Coal. Although the value of the coal produced in South Africa is small compared with that of the gold, it is safe to say that it is the presence of cheap coal, in an area devoid of timber or of hydro-electric power, which has enabled many of the gold mines to be worked at a profit. The coal occurs in the lower part of the great Karroo System, and coalfields are known in Natal, Transvaal, Orange Free State, Zululand, and Cape Province. The principal fields at present worked are around Witbank and Middelberg in the Transvaal (which supply Johannesburg, the goldfields, and the Pretoria iron and steel industry) and around Newcastle, in Natal. The Natal coal goes largely to the port of Durban, which not only supplies bunker coal but has a considerable export; it is also used for generating electricity for the railways. Total output is about 30,000,000 tons a year.

Copper is produced in Namaqualand (Cape), at Messina in the Northern Transvaal, and in South-West Africa. *Tin* is mined in the Transvaal Bushveld.

Iron ore occurs in huge quantities in various areas, especially

near Pretoria. An important iron and steel industry has grown up in recent years.

Other minerals produced in South Africa are asbestos, chromite, platinum, mica, corundum, manganese, graphite, magnesite, and soda. Uranium is now very important.

Climate. Certain outstanding features control the climate of South Africa:

(a) The elevation of the plateau lowers the general temperature to the extent of between 10° and 25° throughout the year.

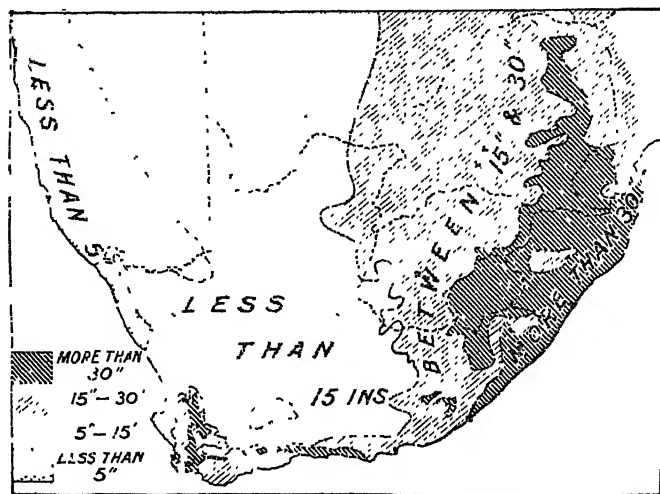


FIG. 111.—Simple rainfall map of South Africa.

(b) Except in the south-west which receives a winter or Mediterranean rainfall of cyclonic origin from westerly winds, the rain-bearing winds are the south-east Trades. These meet the high eastern edge of the plateau and are there robbed of much of their moisture. The lower western half of the plateau gets very little rain indeed.

Climatic Regions. South Africa can be divided into a number of climatic regions:

On the plateau:

(a) The *Tropical Climate* giving rise to typical savana or "bush veld" occurs over the northern part of the Transvaal, roughly from Pretoria northwards.

(b) The *Hot Desert Climate*, giving rise to the Kalahari semi-desert, occurs over the western half of the plateau. The rainfall decreases steadily westwards and the 15-inch rainfall line may be taken as the limiting line.

(c) The *Temperate Continental Climate*, giving rise to treeless

grasslands, is found over the eastern half of the plateau, south of the tropical region of the Transvaal.

Between the plateau and the sea:

(a) The *Hot Desert Climate* occurs down the west coast in a more extreme form than on the plateau.

(b) The *Mediterranean Climate* occurs in the south-west. Eastwards this region fades very gradually into one with rainfall all the year round. The Great and Little Karroo lie in the south-west, but are cut off from the rain-bearing winds by moun-

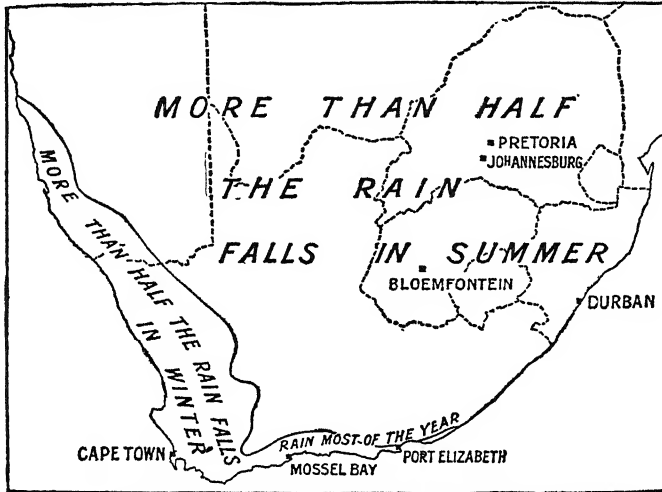


FIG. 112.—The limit of winter and summer rainfall regions.

tain barriers. Such rain as they have comes mainly in winter and they may be regarded either as having a very dry Mediterranean climate or a desert climate akin thereto.

(c) The *Warm Temperate Climate* (Eastralian type) starts about Port Elizabeth and occurs through Natal, passing gradually northwards into tropical and equatorial regions along the coast.

These climatic regions are shown in Fig. 114.

Natural Vegetation. In South Africa most natural vegetation is referred to as “veld”—in the same way as “jungle” is used in India or “bush” in Australia. Different kinds of natural vegetation are referred to as different kinds of veld—bush veld (=savana), grass veld (=grassland), thorn veld, etc. As would be expected, the vegetation regions correspond closely with the climatic regions shown in Fig. 114.

On the plateau:

(a) The *Transvaal and Limpopo Bush Veld* (savana) consists

of grassland with scattered trees and occupies the area with a tropical climate. It commences north of Pretoria and stretches away northwards to the lower and warmer lands of the Limpopo Valley, where frosts and cold winters are rare. The vegetation of the Limpopo Valley forms part of what is sometimes called the "Low Veld."

(b) *The Kalahari Bush Veld* occupies a very large area in the dry heart of the plateau, and covers the greater part of Bechuana-land. As its name suggests, it is a very dry type of savana, with scattered spiny bushes, and a very little grass. The *Namaqualand*

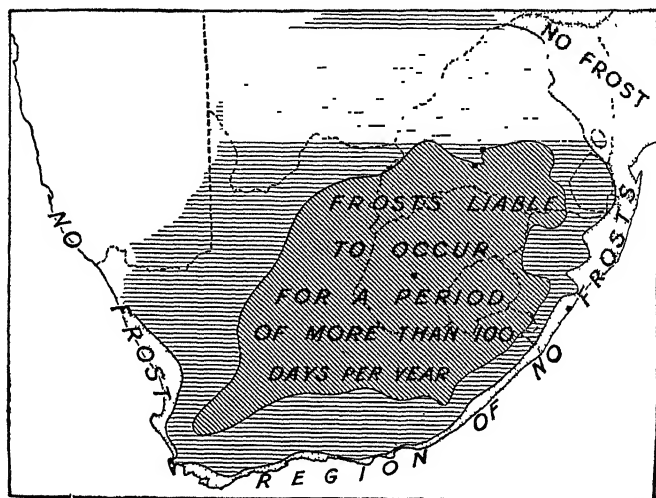


FIG. 113.—Frost map of South Africa.

Vegetation, in which the still smaller shrubs and succulent plants are separated by patches of bare rocky soil, occupies the driest, western part of the plateau. South of the Kalahari and Namaqualand lies the *Upper Karroo*, consisting of vast treeless plains. There is a sparse covering of low shrubs and bushes, but little or no grass.

(c) *The High Veld* is a typical, treeless, temperate grassland and corresponds to the area with the temperate continental climate and thus occupies the southern part of the Transvaal, the Orange Free State, and Basutoland. In Basutoland the monotonous scenery of the normal High Veld is varied by hills, and thorny bushes appear in the rocky parts. Elsewhere this region of hot summers, and dry cold winters with severe frosts, has no trees or bushes but those planted by man.

On the coastal tracts:

(a) *The Namib* is a strip of true desert which occurs down the

very dry west coast. The land consists mainly of shifting sand dunes. With from one to five inches of rain per year it is often very difficult for plants to live at all, and often only scattered tufts of grass or a few succulent plants are to be found.

(b) *The South-Western Scrubland* or the *Cape Mediterranean Vegetation* occupies the region of winter rainfall in the south-west of the Union. Most of the valleys are fertile and cultivated, but the hill-slopes are covered with a vegetation of shrubs, usually

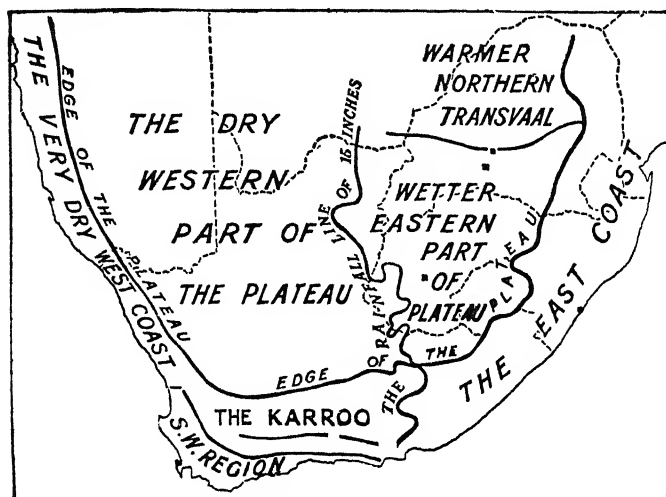


FIG. 114.—Climatic regions of South Africa.

Compare this map with the Physical and Rainfall maps.

from one to six feet high, with small leathery leaves and often a grey-green foliage. There is very little grass. In damper, more sheltered situations patches of forest occur. As one goes eastwards along the coast the summer drought becomes less and less marked. In this area, especially around Knysna, there are still some fine forests in which trees with valuable timber, such as the yellowwood and stinkwood, grow. If we include this forested part, the Cape Mediterranean vegetation extends roughly as far as Port Elizabeth. Many foreign trees flourish in the Mediterranean region—especially pines, oaks, and eucalypts.

The Karroo Vegetation is a semi-desert vegetation of small shrubs and succulent plants, not usually exceeding two or three feet in height. Trees and bushes are typically absent. Usually dull and uninteresting, after rain the Karroo produces a wealth of flowers. The Karroo extends roughly as far east as the 15-inch rainfall line.

(c) *The East Coast Vegetation* occupies the coast from Port

Elizabeth right through Natal. Three belts may be distinguished:

- (1) *The Palm Belt* of semi-tropical plants occurs along the coast where there is an absence of frost. With a hot wet summer the usual vegetation is a dense bush of palms, wild bananas, or a forest of varied trees.
- (2) *The Eastern Grass Veld* or *Thorn Veld* lies between 1,000 feet and 4,000 feet, and stretches from the Palm Belt to the

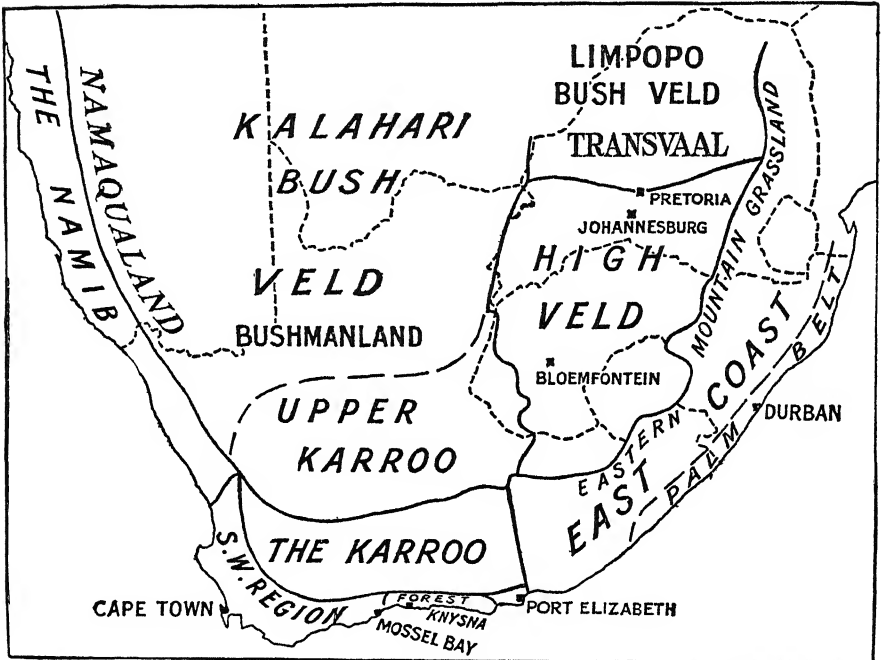


FIG. 115.—The natural vegetation and natural regions of South Africa.
Compare this map very carefully with the last one, showing the climatic regions.

foot of the escarpment. The ground rises by terraces and is covered by grassland with scattered bushes.

- (3) *The Eastern Mountain Grass Veld* and *Eastern Mountain Forests* occupy the eastern slopes of the escarpment mountains.

Forests and Forestry. South Africa cannot be described as a country rich in natural forests. Forest “reserves,” which include sparsely wooded areas, cover only about 3,800,000 acres or 1·25 per cent. of the Union. The natural forests occur in three main areas:

- (1) The Cedar Forests occupy a small area in the Cedarberg Mountains of the south-western area (north of Cape Town).

(2) The Yellowwood and Broad-leaved Forests occupy the seaward slopes and ravines of the mountain ranges of southern and eastern South Africa from the Outeniqua Mountains to the north of Natal. The finest forests are around Knysna in that part of the south-western region which enjoys rain through most of the year. They require a rainfall of from 35 to 70 inches. Besides the yellowwood (*Podocarpus*) there is the fine stinkwood, formerly much used for furniture, the ironwood, the assegai wood, and the pear woods.

(3) The Sub-Tropical Forests of the coasts of the Transkei, Pondoland, and Natal. These forests yield several varieties of fine hard timber.

Foreign trees have been planted in many parts of the country, especially by mining companies, by farmers, towns, and the Government. The most important are:

(1) Various Australian eucalypts (gum-trees) which grow very quickly—70 or 80 feet in seven years—and give good hard wood unless growth is too rapid.

(2) Wattle trees from Australia. The bark of the black wattle is used for tanning leather, and the timber for pit-props.

(3) Various kinds of pines from the Northern Hemisphere, giving wood suitable for box-making.

The planting of trees, especially over the formerly treeless plains of the High Veld, has made a very great difference to the scenery. Many bare, rocky regions, like the northern suburbs of Johannesburg have now become pretty and attractive with a wealth of pine and gum-trees. South Africa is not yet self-supporting as regards timber, and still imports large quantities of hard woods for railway sleepers from Australia and soft woods for building and box wood. The present afforestation policy, however, should render the country self-supporting in 15 to 20 years' time.

Agriculture. Apart from the mining of gold and diamonds, farming is by far the most important occupation in South Africa. Yet only about 5 per cent. of the Union is under the plough, and 12 per cent. is the absolute maximum that could ever be cultivated. The handicaps to agriculture are many: the irregularity of the rainfall, with periodical droughts, soil erosion due to the torrential and seasonal character of the rain, locust plagues, and the necessity for relying on rather costly rail transport, there being no waterways. For a long time agriculture has been subsidised in the Union to a greater or less extent. The original policy was to foster grain-farming by protection, but it came to be realised that in this type of agriculture the Union could not possibly compete with countries such as Canada and Argentina. Thus there is now an increased emphasis on animal and fruit-farming.

Irrigation is being much developed, but intensive farming, such

as is practised in the thickly populated parts of Europe and North America, is only in its early stages. The distribution of many crops is limited to certain natural vegetation regions.

Maize (Indian corn or mealies). Maize is the principal grain of the Union. Not only does it form the staple food of the greater part of the population (excepting only the Europeans) but it also affords excellent food for cattle and considerable quantities of the grain are exported. The principal maize-growing area of the Union, often known as the "Maize Triangle," lies on the High Veld (see

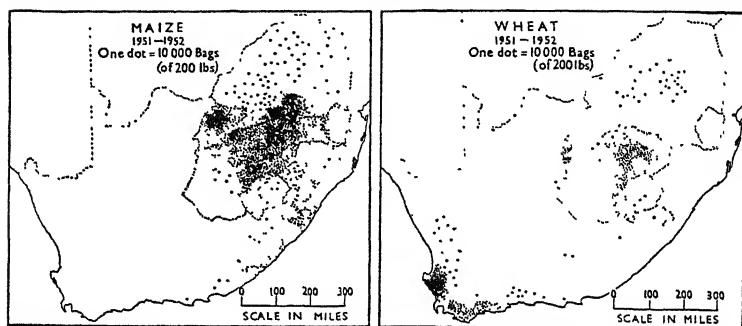


FIG. 116.—Distribution of maize and wheat.

Each dot represents a production of 1,000 tons in a good year (e.g. 1951-52). Notice that the "Maize Triangle" lies in the wetter, eastern part of the High Veld and that wheat is important in the Mediterranean area.

Fig. 116) in the Southern Transvaal and the northern part of the Orange Free State. This area produces between one-half and two-thirds of all the maize grown in the Union. Most of the remainder is grown in the East Coast region. Maize cannot resist drought and so is not found where the rainfall is less than 15 inches. Compared with other maize-growing countries the yield of grain per acre in South Africa is small. It is rather less than four bags of 200 lb. each per acre, whereas in the United States it is over ten bags. In Natal the yield is higher than on the High Veld. When land becomes scarcer it will be necessary to improve the yield by fertilizing, etc., but at present plenty of land is available. As a food for cattle the grain is often used, but silage is also made.

Wheat. South Africa is not a great wheat-growing country, but it grows nearly enough for its own needs. The wheat is nearly all grown in the south-western region during the winter months, when the rain falls, and is harvested early in the summer. Associated with wheat are the other "winter cereals," as they are called in South Africa—rye, oats, and barley. Of these the Union produces sufficient for its needs.

Kaffir Corns or Sorghums. Kaffir corns of various kinds are very largely grown throughout the Union by the natives, but are little

cultivated by European farmers. They are better suited to the drier western parts of the plateau than is maize. There are several different kinds, one of the best is a native of South Africa, but has been improved by careful cultivation in America. Kaffir

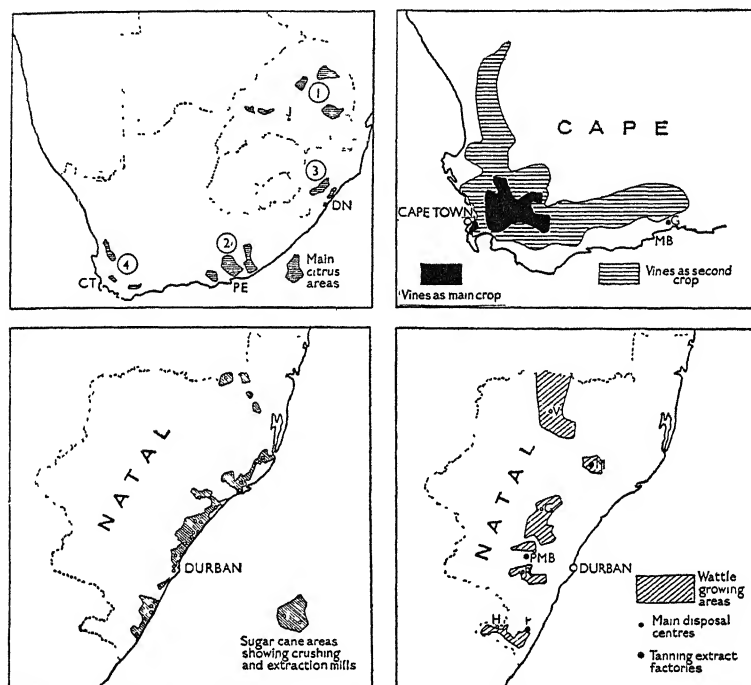


FIG. 117.—Distribution of citrus, sugar-cane, the vine and wattle.

The sugar-cane grows only in the coastal strip (sub-tropical) of Natal; the vine is almost restricted to the Mediterranean Region.

corn is used both as a grain and as a forage crop and is also used for the manufacture of Kaffir beer.

Sugar. The sugar-cane, essentially a tropical or sub-tropical crop, is limited in South Africa to the warm coastal strip of Natal and especially Zululand (Fig. 117). Natal is able to produce more than the total amount of sugar required by the Union, and the surplus is exported.

Fruits. The fruit-growing industry of the Union is now a very important one and is rapidly increasing. In fact, fruit may be said to play second part to gold in the agricultural and industrial life of the Union, by reason of the many secondary industries, *e.g.* drying, canning, wine-making, to which it gives rise. The fruits grown may be grouped into four classes:

- (1) Citrus Fruits—oranges, naartjes or tangerines, lemons, and grapefruit.
- (2) Deciduous Fruits, *i.e.* fruits from deciduous trees, trees

which lose their leaves in the cold season—apples, pears, peaches, apricots, nectarines, plums.

(3) Grapes.

(4) Tropical or Sub-Tropical Fruits—bananas, pineapples, melons, mangoes, pawpaws, guavas, grenadillas.

Owing to the fact that the seasons are reversed in South Africa when compared with Europe, fruit ripens in the Union when it is practically unobtainable in England, so that South Africa has great opportunities in the export trade to England. Over 4,600,000 cases of citrus fruits alone were exported in 1950—much to Britain.

Citrus Fruits are now grown successfully in several areas of the Union, but they require warm, sheltered positions and so we find them limited to three of the regions of natural vegetation:

(a) The South-Western region, especially in the valleys near Cape Town and around Port Elizabeth.

(b) The Sub-Tropical East Coast region around Durban.

(c) The Northern Transvaal, especially in the warmer eastern part.

Deciduous Fruits have long been grown successfully in the early settled south-western region of the Cape, which is still the most important region. There are also many apple and pear orchards on the High Veld, throughout the Orange Free State and the Southern Transvaal.

Grapes. All the vineyards of South Africa are in the sheltered valleys of the Mediterranean region. Not only are grapes grown for eating and for export, but considerable quantities are dried as raisins and currants and quantities of wine and brandy are made. The wine industry had a phenomenal growth after the First World War, and there is now a considerable export.

Tropical Fruits are limited to the sub-tropical coastal strip around Durban.

South Africans eat large quantities of fruits but every year now sees larger quantities being sent abroad. The most important exports are of oranges, pears, grapes, peaches, plums, grapefruit and pineapples (in order of value). Large quantities of fruit are now canned, bottled or dried, both for home use and for export.

Tobacco is grown in a number of different parts of the Union, on the High Veld, South-Western region, and in Natal. On the High Veld and in the South-Western region the warm temperate type used for cigarettes and pipe mixtures is grown, whilst in Natal the tropical type used for cigars and cheroots is cultivated.

Cotton is a crop which has only recently become of importance. It is a sub-tropical crop, and so is almost limited to the Northern Transvaal, Natal, and Zululand.

Tea can be grown in Natal, but it has been found cheaper to import tea than to grow it.

Livestock. Sheep. The breeding of sheep for the sake of their wool is the oldest and most important of all the agricultural and pastoral industries of the country, but its world importance dates only from its rationalization during this century. There are 30-40,000,000 sheep in the Union.

Sheep are well distributed except in the wetter parts of Natal and the Northern Transvaal. The High Veld is, however, the most important region. The original Cape sheep were inferior, but the importation of sheep from England and Holland and, during the present century, from Australia, has improved the stock immensely. The best wool is obtained from the Merino sheep, but the hardiest sheep for the driest regions (such as South-West Africa) is the Karakul sheep, whilst the fat-tailed Cape sheep gives the best mutton. On an average a flock of Merino sheep yields about 11 lb. of wool per sheep, and South Africa is one of the five great wool-producing countries in the world.

Goats. Goats are able to live on the poorest vegetation where even sheep will not thrive. Consequently they are found in large numbers (6 millions) in the dry parts of the Cape Province. South Africa leads in the world's production of mohair, obtained from the long-haired Angora goat, which was originally introduced from Asia Minor; but the industry is declining.

Cattle. There are about 13 million cattle in the Union of South Africa, and the last few years have seen a great improvement in quality. It must still be remembered, however, that amongst the natives cattle are regarded as tokens of wealth rather than as food-producers. Cattle are bred mainly for three purposes:

(1) As draught animals. Although the old-fashioned trek wagon with its full span of sixteen oxen, on which the early European settlers had to depend for transport, has largely disappeared with the spread of the railway and the motor-car, much of the ploughing is still carried out by oxen. The early settlers gradually created a distinct breed of cattle capable of standing long treks, a breed known as the Afrikander.

(2) For the production of beef. Fine natural cattle-ranching country is found in the Northern Transvaal, Bechuanaland, etc., in the various regions of the Bush Veld, but very large numbers of cattle are kept on the High Veld and the natural grassland feed is supplemented by various specially grown fodder crops. The quality of the beef has been greatly improved of recent years by the importation of first quality stock from Great Britain and Holland.

(3) For the production of milk, butter, and cheese (dairy-farming). This industry has also grown rapidly in recent years; the natural cattle country is in the wetter regions of the east coast, but fodder-fed dairy cattle are kept over most of the High Veld.

We should notice that in many of the dry districts of the Karroo

and the High Karroo there are practically no cattle, though sheep are able to thrive there. The map, Fig. 118, illustrates this. In connection with the cattle industry we must notice the various fodder crops. Maize, Kaffir corn, peas, beans, and monkey-nuts are all grown for this purpose and especially for ensilage. For the preparation of ensilage, deep pits are dug and filled with layers of the green fodder crops, with a little salt. The pits are then covered over and the contents allowed to ferment. Part of the moisture dries out and the resulting ensilage can be cut by a chaff-cutter.

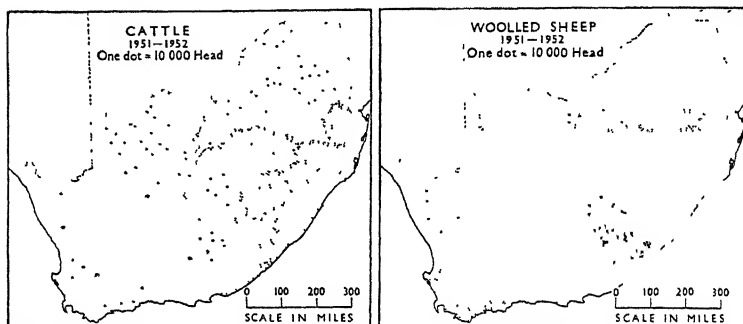


FIG. 118.—Distribution of cattle and sheep.

Each dot represents approximately 10,000 animals (1951-52).

Cattle, sheep, and goats are also very important for the hides and skins which they yield; there is a valuable export trade in these commodities.

Horses, mules, and asses were introduced into South Africa by Europeans. Except in times when there were scourges of horse-sickness, they proved extremely useful, and mules especially proved more hardy than cattle for trekking in dry country. Transport by mule- or donkey-drawn wagons, once important in the dry parts of the Cape Province, has now been replaced by motor transport.

Pigs. The bacon industry has made good progress. There are nearly a million pigs, mostly in the Transvaal and Cape regions.

Poultry. There are good opportunities in South Africa for the development of poultry-farming. This industry progressed rapidly and a very considerable export trade in eggs was established, but the high cost of maize and wheat has had a bad effect.

Ostriches. For several years before the First World War, the production of ostrich feathers was an important industry, centred mainly in the Little Karroo around Oudtshoorn, and the value of the feathers was between two and three million pounds annually. But women's fashions change, and the demand for ostrich feathers has almost disappeared.

Irrigation. A large proportion of the Union of South Africa receives a small rainfall of less than 15 inches. Moreover, the rainfall from year to year is often very irregular and severe droughts may occur for two or more years in succession. Consequently irrigation is a matter of great importance. Although the Union has not, so far as we know at present, any large artesian basins such as are found in Australia, there is often a good supply of water at small depths below the surface, which can be reached by boreholes and pumped up to the surface by windmills. In this way a large number of farms have their own water-supply, especially over the Karroo and High Veld where water is badly needed for watering stock. There are a few small rain-catchment dams as well as a number of river dams. The more important of the latter are:

Hartebeestpoort Dam (Crocodile River) north of Pretoria.

Olifants and Letaba Rivers (north-east Transvaal).

Middle Orange River.

Vaal Hartz River.

Pongola River.

Sundays River, north of Port Elizabeth.

Kamanassie River, near Oudsthoorn.

Tarka River (tributary of the Great Fish River) near Cradock.

Great Brak River, near Fish River Station.

Altogether about a million acres are irrigated by canals in the Union, a very small area in comparison with that of agricultural lands as a whole.

An interesting system employed in South Africa is that known as "warping" or "Zaaidams." Flood water, rich in alluvium, is allowed to spread over the land, and the deposit of silt is then ploughed in.

Dry Farming. The system known as "dry farming" makes it possible to utilize land for crops which would otherwise be too dry. The main principle is to plough the land very deeply and then to cover the surface with a "blanket" of dry soil, which has the effect of preventing the underlying soil from losing its moisture. It has not yet been practised to the same extent as in Canada or Australia.

Fisheries. The southern shores of South Africa have valuable and extensive fishing areas. The industry is carried on in the neighbourhood of the Cape Peninsula, False Bay, Mossel Bay, The Agulhas Bank, and Algoa Bay. The Agulhas Bank promises to be one of the finest and most prolific fishing grounds in the world. The industry is as yet little developed, but crayfish are exported to France.

The *whaling industry* was formerly carried on round the South African shores, especially from Durban. In 1947 the Union took possession of Prince Edward and Marion islands in the Southern Ocean.

Manufactures. One of the most important recent developments in South Africa is the growth of manufacturing industries. The leading industrial regions are the Witwatersrand goldfield around Johannesburg; the south-western region around Cape Town and Port Elizabeth, and in Natal at Durban and on the coalfields.

Apart from the value of the goods produced the industries are of exceptional importance as offering employment to the growing numbers of "poor whites" who have been displaced from agricultural activities through economic causes and mechanisation.

Population. The white population of South Africa has descended from Dutch, English, and French settlers, with a very small infusion of Portuguese, German, and other European races. The Dutch in early days severed their connection with their mother country and the Dutch language as used in South Africa suffered many changes. Afrikaans, the South African form of Dutch, varies widely from ordinary High Dutch. When the Union was formed in 1910 both English and Afrikaans were recognized as official languages. English predominates in Natal and the town districts of the Transvaal, but Afrikaans is the principal language amongst the farming community of the O.F.S. and the Transvaal. In Cape Province the usual rule is English in the towns, Afrikaans in the country districts; but it is the policy of the schools to make all South Africans bilingual. 65 per cent. of the white population can speak Afrikaans.

In the 1936 census the following fourfold classification was used: (1) Europeans. (2) Coloured (mixed). (3) Natives. (4) Asiatic.

This is the classification officially adopted, and below are the numbers at the last full census (1951) to the nearest thousand:

	European	Coloured	African	Asiatic	Total
Cape . . .	936	980	2,484	18	4,417
Natal . . .	274	32	1,803	299	2,408
Transvaal . .	1,205	75	3,473	49	4,802
O.F.S. . . .	228	15	776	—	1,018
Union . . .	2,643	1,102	8,535	366	12,646

In the 1946 Census, however, the main division used was into Europeans (2,372,690) and Non-Europeans (9,019,259), of the latter 7,805,515 were Bantu, 285,260 Asiatics, and 928,484 other races. A similar classification was used in the 1951 Census for which the figures have been given above. There were then 365,524 Asiatics and 1,102,323 Coloured.

Africans. The African population is now very largely restricted to the eastern and northern parts of the Union. This is important, because whereas in the temperate regions of the south the climate is suitable for white labour, cultivation in the warmer districts

of the north and east must depend largely upon Native labour. The great mining district of the Rand also depends on an adequate supply of Native labour, drawn to some extent from Portuguese East Africa.

The natives are mostly Bantus and include such widely different races as Matabele, Zulu, Basuto, Bechuana, Barotse, Swazi, Griqua, Xosa (Kaffir), etc. Amongst the most noteworthy are the Zulus who inhabit the fertile and productive east coast. They are powerfully built and intelligent people, and it is for this reason that they have been able to hold the best lands.

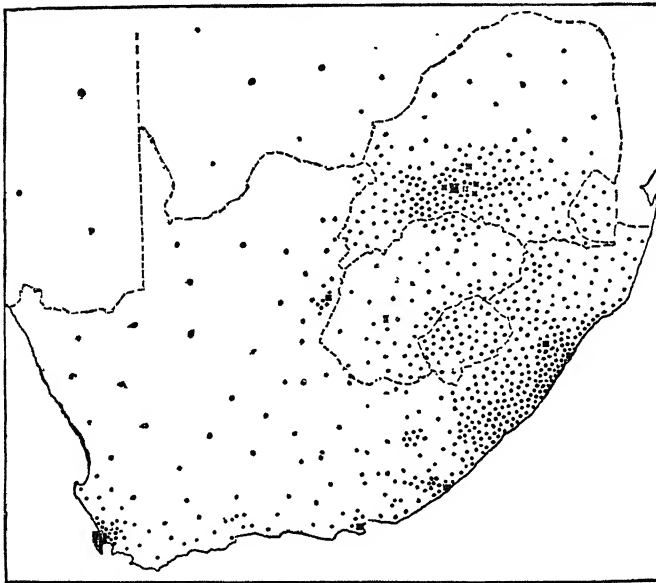


FIG. 119.—The population of South Africa (all races).

Each dot represents roughly 10,000. All towns with more than 10,000 people are marked by a square dot

Among the non-Bantu native races the most interesting are the Hottentots of the south-western coastal belt and the Bushmen. The latter are very primitive, small in stature, and weak in warfare. They have been driven by stronger tribes to the inhospitable borderland of the Kalahari Desert, and are tending to die out.

Mixed or Coloured. As a result of the intermarriage of the white settlers and the Native races a large mixed population has arisen, usually known as "Coloured persons." They are especially numerous in the south-western districts around Cape Town. Other coloured persons are of Hottentot-Kaffir or Hottentot-Malay parentage.

Asiatics. The Asiatic population consists almost entirely of

Indians and Malays. The larger number of Indians were brought to South Africa to work on railway construction and in the tropical plantations of the east coast. Many of them have settled and have been followed by many of the Trader class.

The native and coloured races of South Africa are of the greatest importance economically; for not only do they provide cheap labour of the unskilled and semi-skilled types, but also, as they outnumber the Europeans by about four to one and are steadily increasing, afford a large local market. Under the influence of European peoples the native and coloured peoples show strong desires to attain a higher standard of living—a tendency which greatly increases the importance of the local market.

A great problem is presented by the growth, during the last quarter of a century, of an ever-increasing body of white people not belonging to the land-owning or professional classes. These people, numbering at present some 300,000, are mainly located in the Rand.

Communications. South Africa is well served by an excellent railway system. The first railway (from Cape Town to Wellington) was commenced in 1859 and there are now over 13,000 miles of railway in the Union. The railways and harbours are owned and controlled by the Union Government, being administered by a special department. The railway gauge is 3 feet 6 inches, and South Africa is an example of the excellent result which can be achieved with a narrow gauge. Fig. 120 shows the position of the principal lines. Notice first of all the position of the four main ports of the Union—Cape Town, Port Elizabeth, East London, and Durban, and also of the Portuguese port of Lourenço Marques which serves the eastern Transvaal. Notice next how these ports are connected with the leading towns of the Orange Free State and the Transvaal. From Cape Town there is a long main line through the Bechuanaland Protectorate to the town of Bulawayo in Southern Rhodesia, where it links with the Rhodesian railways. This line runs through Kimberley and has an important branch to Johannesburg. The railways of South-West Africa were connected with those of the Union in 1915 in the early days of the First World War.

It is a great advantage to South Africa that the railways and harbours are under one control. The railways are able to make special arrangements for taking coal from the collieries right to the sides of steamers in the harbours. Again the railways have constructed a series of maize elevators in the maize-growing districts and at the ports to enable the farmer to ship his produce more cheaply and easily. Electrification of the railways has been commenced, notably in Natal, which has now one of the largest stretches of electrified *main* lines in the world, and in the Cape Town and Johannesburg districts.

Proportionate to area and population, however, South Africans make greater use of roads and cars than any people outside America. Air travel is also very popular.

Harbours. Most of the foreign trade of the Union passes through the four leading ports and through Lourenço Marques; the trade of the minor ports (Mossel Bay, Port Nolloth, Simonstown, Knysna, Walvis Bay, etc.) is less than 10 per cent. of the whole. Though still of great importance, Cape Town has had to yield pride of place, commercially, to Durban. Cape Town may attract more ships (the

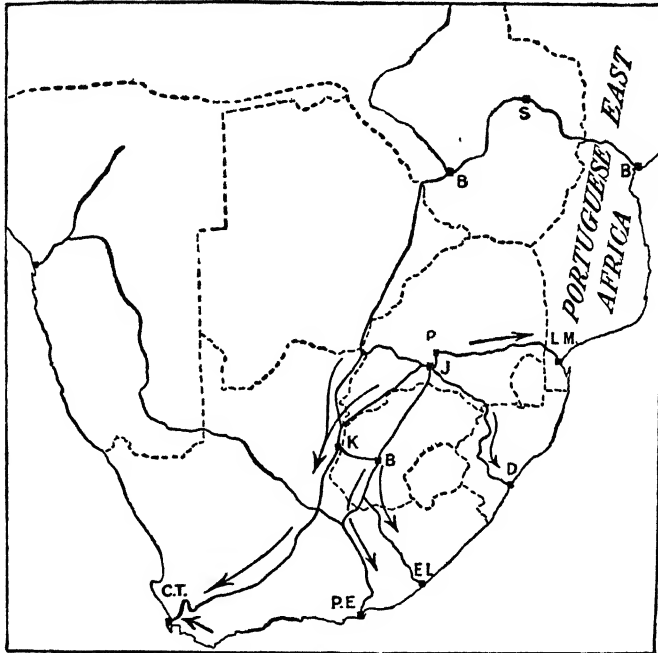


FIG. 120.—Main railways and ports of South Africa.
Over 12 million tons of cargo are handled yearly by the ports

record has varied in recent years), but Durban has the greater tonnage and greater value of both imports and exports. In 1951 Cape Town was entered and cleared by over 1,750 vessels of nearly 8 million net tons, against 1,500 vessels of rather more than 6 million tons at Durban; but whereas cargoes totalling $2\frac{1}{2}$ million tons valued at £91 million were landed at Cape Town, at Durban more than 3 million tons valued at over £152 million were landed, and while over a million tons valued at £45 million were shipped from Cape Town, Durban shipped over 3 million tons valued at £54

million. Port Elizabeth has also become a strong competitor of Cape Town as regards the value of its imports and exports.

Cape Town. Cape Town serves as the outlet not only for the western part of the Cape Province, but for a large part of the whole Union and Rhodesia. Diamonds from Kimberley and the gold of

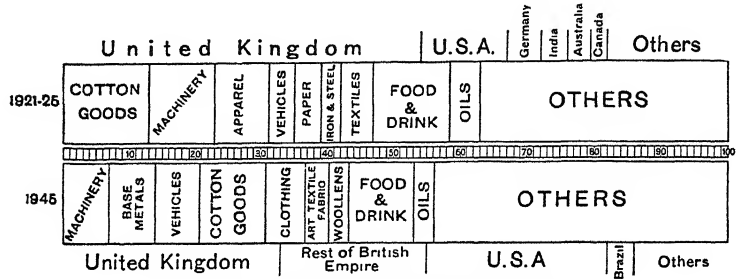


FIG. 121.—Union of South Africa: Imports.

the Witwatersrand are sent through Cape Town. A large maize storage elevator has been built, and the harbour is equipped with a dry dock. Before the construction of the harbour Table Bay did not afford sufficient protection to ships when the north-westerly winds were blowing, and many wrecks occurred in the old days, so that an artificial breakwater was commenced as long ago as 1860.

Port Elizabeth Harbour is situated on the shores of Algoa Bay. The ships used to anchor out in the Bay and were loaded or off

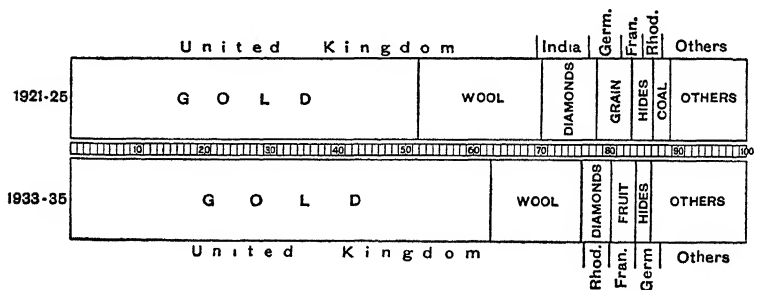


FIG. 122.—Union of South Africa: Exports.

loaded from lighters, but extensive harbour works now enable ocean steamers to be berthed alongside the quays.

East London Harbour is situated at the mouth of Buffalo River, the entrance being protected by breakwaters.

Durban Harbour or *Port Natal* consists of a sheltered bay with a narrow entrance. The entrance suffers from the presence of a sand

bar, and constant dredging is required to keep the entrance clear. Durban has up-to-date coaling plant, a modern maize elevator, and a large floating dock.

Foreign Trade of South Africa. This is illustrated in Figs. 121-2. Fig. 122 refers to the pre-1939 position because later figures for gold exports are not published.

CAPE PROVINCE

The South Western or Mediterranean Region. The first part of South Africa to be colonized by Europeans was that part which has a climate closely comparable with the home of so many European and Asiatic civilizations—the Mediterranean climate.

The region is on the whole a mountainous one and consists of ranges of mountains enclosing sheltered and fertile valleys in which the population is concentrated. Most of the mountains are built up of a hard, resistant series of sandstones, called the Table Mountain Sandstones, from the fact that they build up the well-known Table Mountain. The region as a whole is bounded on the landward side by a series of ranges the most important of which from north to south are the Cedarberg, Bokkeveld, Hex River Mountains, the Langebergen, and the Outeniqua Mountains. These ranges cut off the south-western region from the dry Karroo.

The mountain scenery in this part of South Africa is magnificent. There are long, sinuous passes between lofty mountain-barriers. Down these passes run river courses almost dry in the rainless season but filled with roaring surging cataracts and flood waters in the wet season. The railways communicating with the interior follow these passes and thus we find steep gradients near the coast. One of the most celebrated passes is the Hex River Valley. When floods occur, washaways on the railways are frequent.

Fig. 123 shows the proportion of land under 1,000 feet. In the northern part the land tends to be lower and the region extends as far as Oliphants River.

The climate is characterized by winter rain, but eastwards towards Port Elizabeth the influence of the Trade Winds is felt and rain falls practically throughout the year. This area might be considered as a sub-region. The rainfall varies greatly over the whole region; for example, at Cape Town it is only 20 inches at the Royal Observatory, but over 70 inches on Table Mountain. The average temperature of Cape Town is 62 degrees—roughly the same as Naples. Frost is rare on the lowlands, but snow frequently falls on the mountains.

The natural vegetation consists of shrubby plants with a wealth of flowers, covering the mountain slopes; the valleys are almost

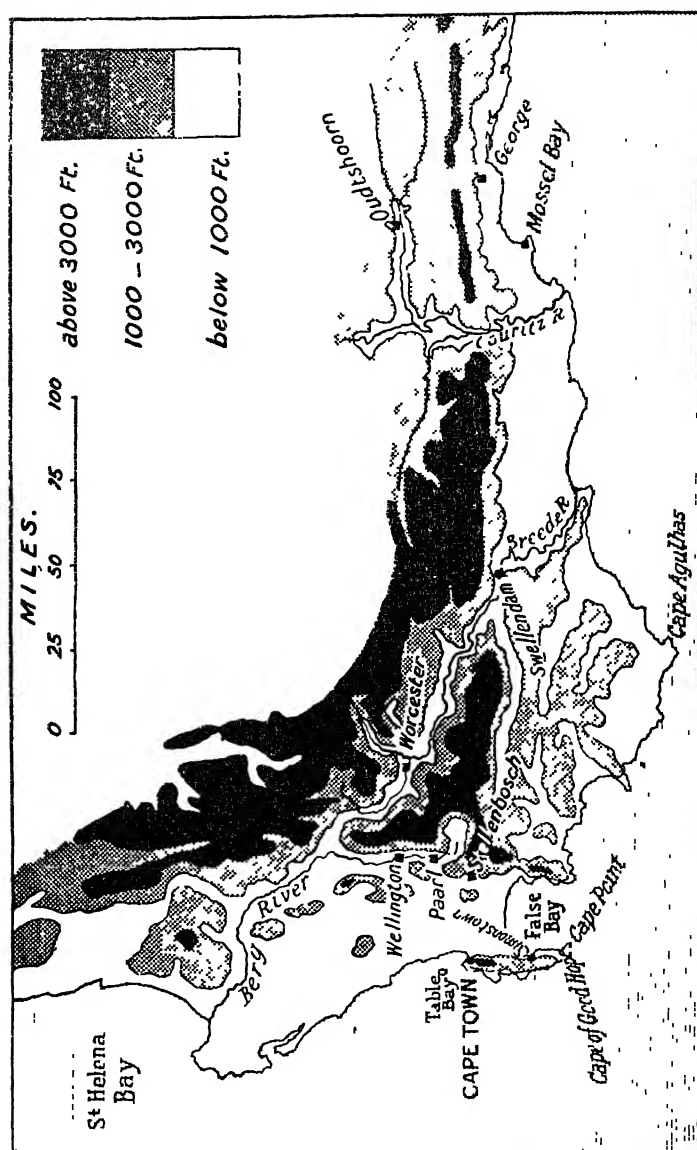


Fig. 123.—The Mediterranean or south-western region.

entirely cultivated. Forests grow in the damp "kloofs"; in the wetter regions round Knysna fine natural forests still exist. The sheltered valleys are famous for their fruit orchards and vineyards. Though originally introduced by the early Dutch settlers, viticulture and fruit-farming undoubtedly owe their development and success to the application of the French Huguenots, who, after the revocation of the Edict of Nantes (1685), settled in South Africa. The fertile valleys of the Berg River, Breede River, and Hex River are eminently suited to this type of farming. The neighbourhoods of Paarl, Wellington, Worcester, Stellenbosch, French Hoek, Montagu, and the Constantia District of Wynberg (Cape Peninsula) are noted for their trim vineyards and fruit orchards. Wheat is the principal cereal. Mixed farming has been carried on by Europeans from early days, and most of the available land is tilled.

The fruits already mentioned as produced in this district give rise to many industries. First of all there is the exportation of *fresh fruit*. As the crop is ripe at a time when these fruits are not in season in the Northern Hemisphere, there is a great demand for them in European and American markets. Grapes, peaches, apricots, oranges, naartjes, plums, pears, and figs are exported in large quantities. Owing to the perishable nature of these fruits and the long distance they have to be transported, it is necessary to preserve them in cold storage. So rapid has been the development of this trade that steamers calling at Cape Town, from which most of the fruit is exported, have had their cold-storage capacity increased. In spite of this fact, fruit has frequently to be detained at Cape Town owing to lack of cold-storage capacity. Fruit of similar kinds is exported from the "Mediterranean" regions of Australia; but, as the journey is considerably longer, South Africa possesses a great advantage. The fruit for export purposes is specially selected and in the case of grapes especially careful pruning, trimming, and selecting are necessary. The *drying of fruits*—especially apricots and raisins—is becoming important, and great developments are possible in this direction. The *manufacture of wines and brandies* is carried on on a considerable scale. The use of French names for the wines is prohibited, but a large export trade is developing, mainly with Britain, where Empire wines are being popularized.

Tobacco grown in this region is locally manufactured. The chief factories are in Cape Town, where large quantities of cigarettes and pipe tobacco are turned out. Some of the tobacco used in these factories, however, is grown in the Transvaal (Magaliesberg) and Southern Rhodesia.

It is interesting that attempts to grow the olive and to produce olive-oil have not been successful. In Cape Town, as well as in some of the Eastern Province centres, various forms of *leather*

goods are now manufactured, especially *boots and shoes* and *harness*. There is still, however, a large import from Europe and the U.S.

Cape Town. Cape Town is the largest town and the legislative capital of the Union of South Africa. Notice its fine position on Table Bay sheltered by Table Mountain. It has an important university; it is the starting-point of the South African Railway system, and there are important railway works at Salt River a few miles from Cape Town. Cape Town is one of the leading ports, and has a well-equipped harbour (during the Second World War the docks were enlarged to five times their former extent) with two dry docks (one the largest in the Southern Hemisphere), maize elevator and storage sheds. It is the natural outlet for the region; it is the nearest large port to England, and remains the port of call for steamers *en route* for Australia. The population (1951 Census) is over 570,000, of whom 248,000 are Europeans; the non-Europeans are mainly "coloured persons," only a few being Natives.

The rocky Cape Peninsula is separated from the mainland mass by a flat area of sand-dunes often called the Cape flats. To the north is Table Bay, to the south is False Bay. False Bay is protected from the north-westerly winds. Along its shores are many delightful seaside resorts, such as Muizenberg and Somerset Strand. On the shores of the bay is situated the small naval base of Simonstown. *Stellenbosch* is situated in a delightful valley surrounded by mountains. It is a university town, and a religious and cultural centre of the Afrikaans-speaking people. *Wellington, Paarl, Stellenbosch, Swellendam, and Worcester* are all the natural centres of the fertile valleys in which they stand and act as collecting centres for the local produce. The position of Worcester in particular should be noted; it lies at the foot of the Hex River Valley. *Mossel Bay* lies in a sheltered bay and commands two passes across the Outeniqua Mountains into the interior, and so is the outlet for the fertile valleys around Oudtshoorn. *George* is a fruit-growing centre, whilst *Knysna* lies in the forested region. *Uitenhage*, at the eastern end of the region, is an important centre for the citrus-growing industry. Considerable areas of rich land have now been irrigated from the Sundays River, and the district is progressing rapidly. Situated on Algoa Bay, *Port Elizabeth* is the natural outlet of a large area of South Africa, including the Orange Free State. It is not naturally a good port, and extensive harbour works have had to be built in order to cater for shipping. With the completion of these it is fast becoming a leading port of South Africa, mainly as the result of its position, *i.e.* its nearness to a productive hinterland. It is the third port of the Union, and has a large wool trade. Recently manufacturing industries have been developed, and the General

Motors and Ford motor works of South Africa are here. The population in 1951 was 188,000.

Sub-tropical Eastern Coast. This region stretches from Port Elizabeth along the coast to the Natal border and inland as far as the great escarpment. It has a good rainfall throughout with a high temperature and an absence of frosts along the coast. The palm belt with tropical fruits occupies the coastal strip; grassland with scattered trees and forests in the deeper valleys occurs inland. This is one of the great cattle regions of South Africa; the principal grain is maize. There is a large Native population, and little room for European expansion, especially in the eastern part of the region, known as the Transkei and occupied largely by a Native reserve. The citrus orchards are situated mainly around the European centres of Port Elizabeth and East London. *East London* (91,000 inhabitants) is the largest town and port; it does *not* depend for its importance on the region itself, but is the outlet for the interior as far as the Orange Free State. Like Port Elizabeth, it has developed manufacturing industries depending on the supply of raw material from the hinterland, and exports wool, hair, and leather produced on the High Veld. It is a very popular seaside resort. *Grahamstown* and *King Williamstown* are the most important of the inland centres, the former as an educational centre. *Queenstown* is farther inland, being situated just below the great scarp.

The Namib. The greater part of the Namib lies in South-West Africa. In this coastal strip are found the most extreme desert conditions known in South Africa, the rainfall being less than 5 inches per year and very irregular.

The Karroo. Both the Great Karroo and the Little Karroo are treeless plains hemmed in by mountains. Not only is the rainfall small (less than 15 inches), but it is very irregular. Usually drab and monotonous, the small shrubs and succulent plants burst into flower after a shower of rain and the country looks comparatively fertile. Indeed, where water is available, the soil is very fertile. The Government is quite aware of its immense possibilities and is already financing irrigation schemes. In particular, extensive irrigation works are being carried out in the Little Karroo, around Oudtshoorn. Oudtshoorn is the centre of the now dying ostrich-farming industry. Settlements on the Great Karroo are far apart, and the herds of goats form the principal source of wealth. *Beaufort West* is the chief town.

The Upper Karroo or Karroid Plateau. This region lies north of the great escarpment. Nearly the whole is more than 3,000 feet above sea-level and slopes gently northwards towards the Orange River. It suffers from extremes of temperature, with severe frosts in winter and dry heat in summer. The rainfall is less than 15 inches and is very irregular. The Upper Karroo consists of vast

treeless plains broken by flat-topped hills. The soil is shallow and rocky. The vegetation consists of small scattered bushes and supports only a few sheep and goats. The whole region is very thinly populated and people depend on underground water which is raised by wind-driven pumps. There are no towns in the region of any size, but *Carnarvon* and *Victoria West* are the principal centres of the pastoral industry. The people of this district suffer greatly from drought, and there has been no appreciable rainfall here for periods of three years and more.

Bushmanland. Around the Orange River the Upper Karroo passes into an area which has a still poorer and sparser type of vegetation. There are large patches of bare stony or sandy soil. Often the only plants are widely separated shrubs and, locally, tufts of grass.

The Kalahari Thorn Belt. This region includes a great part of the Bechuanaland Protectorate and will be considered later under Bechuanaland. In the area which lies in Cape Province the eastern border is of interest and importance owing to the occurrence there of the famous diamond mines of Kimberley and the ranching districts around Mafeking. *Kimberley* (62,000 inhabitants) has grown up entirely as the result of the diamond-bearing "pipes." The value of the diamonds produced at Kimberley at one time exceeded that for the whole of the remainder of the world, and diamonds rank third amongst South Africa's products after gold and wool (but see p. 171).

The High Veld. Only a small part of the north-eastern border of Cape Province lies within the borders of the High Veld; it is this region, however, lying north of the Stormberg (Fig. 105) which has the greatest density of sheep population to be found anywhere in the Union.

ORANGE FREE STATE

A small part of the Orange Free State along the western border has a rainfall of less than fifteen inches and forms part of the High Karroo. All the remainder lies on the High Veld; the land slopes from the east gently westwards and the rainfall likewise decreases from east to west.

High Veld. The High Veld is a vast, treeless, rolling plateau of grass. Where once large herds of antelopes roamed we now find vast herds of cattle, and in the drier parts flocks of sheep and goats. This is the chief pastoral region of the Union. The damper part forms a portion of the famous "maize triangle," whilst in the drier parts wheat is produced. All over the High Veld farms are dotted each with its cattle sheds, apple orchards, and often with plantations of pines or gum trees. Another tree which has been extensively planted is the Australian wattle, the bark of which is used in tanning

leather. Owing to the frequently precarious rainfall and the consequent periodic droughts, farming in this region is not always an enviable proposition. Great losses of stock and crops are recorded during the droughts. In addition to this danger there is the locust pest which has assumed alarming proportions. The locusts swoop down in dense clouds, so thick as to darken the neighbourhood, and in a few hours not a green leaf or blade of grass is to be seen over hundreds of acres. The pest occurs periodically, for the female lays hundreds of eggs which may not be hatched for two or three years. Great efforts are being made to exterminate the locust entirely. Near the western border of the Orange Free State is the diamond centre of Jagersfontein, a few miles from Kimberley in the Cape. Near the northern border of the Free State along the Vaal River there are coalfields, but as yet they are little developed, and unfortunately the quality of the coal is not good enough for export. Coal probably underlies the whole of the northern part of the State (see Fig. 109) and the recently developed goldfields are also in the north.

Bloemfontein (109,000 inhabitants) is the administrative centre of the Free State, and is the natural collecting and distributing centre for the agricultural produce. It lies in the drier part of the State in the wheat and sheep area and just outside the main maize and cattle region. It is also a railway centre and the legal centre of the Union. *Kroonstad* and *Bethlehem* are two of the principal centres in the maize belt. Great progress has been made in recent years in the maize industry by the construction of maize elevators throughout the Free State, and the greater part of the maize crop is now handled in bulk and not by the old system of bags.

TRANSVAAL

The development of the Transvaal has depended on its mineral industries, especially gold and coal, rather than on agriculture, though the latter is also of great importance. There have been extensive changes in the scenery of the country by reason of the development of industries in the goldfields of the Witwatersrand.

High Veld. The High Veld in the Transvaal is very similar to that in the Orange Free State, except in the Witwatersrand industrial region. It forms part of the great maize and cattle area, and extends roughly as far north as Pretoria. There are scattered farms as in the Orange Free State, each with its clump of foreign trees (gum, wattle, or pine) and orchard of deciduous fruit trees.

The Witwatersrand industrial region extends for 70 miles east and west through Johannesburg along the line of the famous banket reef. It is the greatest goldfield in the world, and produces roughly half the world's annual supply of gold. The development of the goldfield has been made possible by the supplies of cheap coal from Witbank and the abundance of cheap native labour. The coal

is used for generating electricity, and the supply of cheap electricity has also made possible the development of other industries. There are now eight industrial towns with more than 50,000 inhabitants—Johannesburg, Springs, Germiston, Roodepoort, Krugersdorp, Benoni, Brakpan, and Boksburg, and the whole area forms the nearest approach in Africa to a “conurbation,” or group of industrial towns, with a total population of over 1½ million. *Johannesburg* is the largest town in the Union and the leading industrial centre. In 1951 there were 880,000 inhabitants of whom 360,000 were Europeans and 520,000 natives. The town was founded in 1886 and progressed with remarkable rapidity. The gold-bearing banket is crushed by rollers and stamps and the gold extracted; all round Johannesburg there are huge dumps of waste white sand. One group of mines alone deals with a quarter of a million tons of ore per year. Some of the mines are now as deep as 7,000 feet. The bare veld around Johannesburg has been beautified by plantations of trees, especially gums planted for supplying pit props and mining timber as well as for ornamental purposes. The water-supply is derived mainly from the Vaal River. Johannesburg has a focal position, with easy access from the leading ports of Lourenço Marques, Durban, Port Elizabeth, and Cape Town, and good rail facilities for the distribution of manufactured products throughout South Africa. *Germiston* (150,000 people) is nine miles west of Johannesburg, almost in the centre of the gold region. It has the largest gold refinery in the world, and is an important railway junction. Other industries have been developed, including chemicals (carbide), engineering works, cement pipes, agricultural products (cornflour, starch, and cattle foods). A few miles to the north-west is *Roodepoort* (78,000). *Brakpan* (85,000), *Boksburg* (64,000), *Benoni* (94,000), and *Springs* (119,000) all lie to the east of Johannesburg in the East Rand: they are all gold-producing centres. *Krugersdorp* (76,000) (near where the gold-bearing banket was first worked) lies to the west of Johannesburg in the West Rand. *Witbank* and *Middelburg* are coalfield centres. The coal is sent mainly to the Rand and Pretoria, but a little is now exported. Notice the position of these coalfields on the railway between Pretoria and Johannesburg and Lourenço Marques. *Potchefstroom*, to the south-west of Johannesburg, is the old capital of the Transvaal. *Vereeniging*, to the south of Johannesburg on the Vaal River, has iron and steel works, since 1944 greatly expanded.

The Bush Veld. This region, which occupies the greater part of the Northern Transvaal, is rapidly increasing in importance, though there are still large areas undeveloped. The whole region is often divided into a number of smaller regions:

(a) *Banken* or slopes. About Pretoria the country consists of lines of hills running from east to west, the most important being

the Magaliesberg. The strata dip northwards, the gentle slopes are grass covered, but the rocky parts have thorny bushes. In this area there are valuable iron ores, which are now being developed, lime and cement works. The Premier Diamond Mine lies some distance eastwards from Pretoria.

(b) The bush veld lies farther to the north, and consists of grass land with numerous thorny bushes. In this region is the famous Haartebeestpoort Dam on the Crocodile River. This is one of the largest of the irrigation works in South Africa.

(c) The Waterberg sand veld and Pietersburg Plateau lie to the north of the Transvaal bush veld.

(d) The Limpopo bush veld or low veld occupies the broad valley of the Limpopo River.

The region as a whole drops irregularly from the neighbourhood of Pretoria northwards to the Limpopo River; there is therefore an increase of temperature as lower ground is reached, and near the Limpopo the climate becomes tropical, and malaria is prevalent. When compared with the High Veld the agricultural activities of the region give evidence of its warmer character. It is a fine cattle-ranching region, but there are few sheep; citrus orchards flourish, but not deciduous fruits; cotton, tobacco, pea-nuts (monkey-nuts or ground-nuts) and other tropical or semi-tropical crops are grown. In the extreme north, near the Limpopo, lies Messina, where deposits of copper are being worked. The Beit Bridge has recently been constructed across the Limpopo at this point with the object of connecting the Transvaal and Southern Rhodesia by rail and road.

Pretoria. Pretoria, with 283,000 inhabitants, is the administrative capital of the Union; it is a fine city, and is situated in a pleasant open valley. Notice its position between two large natural regions. It is 45 miles by rail or good road from Johannesburg, and a short distance from the coalfields. The proximity of the coal to large resources of iron ore has recently resulted in the inauguration of the first modern iron-smelting works in all Africa. At a cost of some £6,000,000, the South African Iron and Steel Industrial Corporation (ISCOR) has erected coke-ovens, smelting plant, steel works, rolling mills and sheet works at Pretoria, capable of producing 800,000 tons of steel a year. Smelting actually began early in 1934. Pretoria already possessed extensive railway workshops; the new iron and steel industry will doubtless attract other manufacturing establishments. North-east of the city lies the Premier Diamond Mine, where the Cullinan Diamond, the largest in the world, was found.

Eastern Low Veld. This region lies below the great scarp. Frosts are rare, and the region is semi-tropical. It is potentially a valuable area and settlers have developed tropical crops while the Kruger National Park attracts many visitors.

NATAL

The whole of Natal lies below the great scarp, which is here called the Drakensberg, but the land rises from the sea by a series of steps due to the horizontal strata (see Fig. 124). The region is wet, the rivers are nearly always full of water, and pass over the steps in a series of waterfalls.

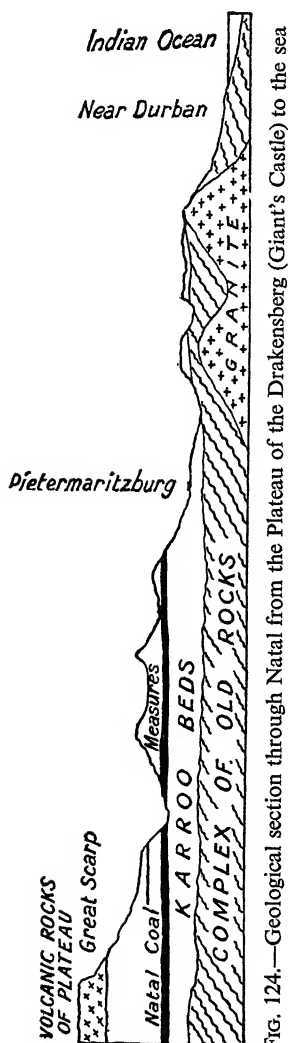


FIG. 124.—Geological section through Natal from the Plateau of the Drakensberg (Giant's Castle) to the sea

Coastal Strip or Palm Belt. Along this sub-tropical strip frosts do not occur. There is an excellent soil, and as a result the land supports a big Native and Indian population. The palm belt extends up to a height of 1,000 feet and includes the greater part of Zululand in the north. Maize is the principal grain, but sugar-cane is the chief crop grown in European plantations. Tropical fruits, especially pines, are extensively grown, and there are plantations of the Australian black wattle. Cattle are numerous, and dairy-farming is important. A beginning has been made with the cultivation of cotton in Zululand, but the quality needs improving. Durban lies in this belt.

Grass Veld and Thorn Veld. This belt stretches inland from the Palm Belt to the foot of the scarp. It is often called the sweet veld. It is drier than the Coastal Belt, and Kaffir corn is the principal grain. In this region lies the coalfield of Newcastle, and large quantities of coal are mined for export through the port of Durban.

Mountain Grass Veld (Sour Veld). The mountain slopes are covered with grass and with forests in the sheltered parts. There is much very fine scenery in the Drakensberg, and

the highest point in South Africa is the Giant's Castle (11,000 feet). The horizontality of the strata is responsible for the characteristic bold

scarp landscape (Fig. 124). Great difficulty was experienced in constructing a railway through the mountains into the Transvaal: the railway has recently been electrified.

Durban (Port Natal). The harbour of Durban is a natural bay with a narrow entrance which was formerly obstructed by a sand bar. The sand bar has been partly removed by constant dredging. The Port is well equipped with grain elevators and has the largest floating dock in South Africa. Durban is the principal coal-exporting centre of the Union. It is the third town of the Union, with 475,000 inhabitants, of whom about one-third are Natives, one-third Indians, and rather less than one-third White. The numerous fine bathing beaches to the north and south of Durban attract large crowds of holiday visitors. A small whaling industry is centred at Durban. Tea is grown to some extent in Natal and prepared at Durban, but the bulk of the tea used in South Africa is imported. The fruit-growing in Natal has given rise to a trade in the distribution and export of fresh fruit, as well as to jam manufacture. More important is the manufacture of sugar and its by-products—syrup and molasses. The cane is grown chiefly in Zululand, but the manufacture of sugar is centred in Durban. Recently the preparation of natalite, a type of motor spirit, from sugar has been tried with considerable success. *Pietermaritzburg* (75,000) is the administrative centre of Natal; its foundation dates from 1839.

Newcastle is the principal colliery town. There are possibilities in the development of various industries; it has already an iron and steel industry and a large creamery.

BASUTOLAND

Basutoland is really an African Reserve. It is situated on the High Veld, that is, to the west of the escarpment, but the scenery is rather different from that of the Orange Free State. The country is more mountainous, and the rivers, which are usually perennial, have cut deeper valleys. Many of the hills are capped by black lava flows of basalt. The rainfall is inclined to be erratic, but averages 30 inches; its torrential character in summer results in much soil erosion. Maize, sorghum, and wheat are the chief food crops, of which in normal years there is a small export surplus. Sheep, goats, and cattle constitute the livestock wealth; wool and mohair are exported. There are 600,000 Africans, many of whom work in the mines of the Transvaal, 2,000 Europeans, whilst the administration is carried out by a resident Commissioner, aided by a Council of Natives nominated by the Chiefs. Education is in the hands of missionaries.

SWAZILAND

The Swazis are akin to the Zulus who live just to the south-east. Swaziland lies below the scarp and is therefore divided into high, middle, and low veld—the middle and low veld are separated by the Ubomba Mountains. Maize is the chief crop, and there are nearly half a million cattle. Cattle are regarded as wealth by the natives, and the stock is in consequence of poor quality; there is much overgrazing, resulting in soil-erosion and diminution of water-supply. The Colonial Development Corporation has undertaken a re-afforestation scheme. A large asbestos mine is in regular production.

BECHUANALAND PROTECTORATE

This huge area of more than a quarter of a million square miles includes nearly the whole of the so-called Kalahari Desert. Really the whole is a grassland with scattered trees, mainly acacia. It has a fine winter climate but very hot summers; fever is prevalent, because mosquitoes breed near any water. The great trouble is the scarcity of surface water. The country is flat, except near the Transvaal border where there is fine hilly scenery. Although there are no rivers, there are well-defined watercourses, and a large lake, Lake Ngami, which is, however, very shallow and often nearly dry. Population is 290,000 including nearly 2,500 Europeans, mainly along the Rhodesian railway line. Ranching is the principal occupation; there are over a million cattle and nearly the same number of sheep and goats. Live animals and hides and skins are exported and a large abattoir has been erected. Maize and sorghum are the chief crops.

SOUTH-WEST AFRICA

In 1814 the Cape Government sent a German missionary into South-West Africa. He settled in the country and was followed later by other German missionaries and traders. In 1876 the natives asked the British for someone to rule over them, but only Walvis Bay was annexed. The Germans purchased the rest of the coast between 1882 and 1885, the whole country was annexed by Germany in 1890. In the First World War, Windhoek, the capital, was occupied by Union forces in 1915, and later the whole German force surrendered. South-West Africa is now administered by the Union of South Africa.

The whole country is a third of a million square miles. There are no perennial rivers except the Orange, which forms the southern boundary, and the Kunene, which forms the northern boundary. The population is about 400,000 including 50,000 Europeans; the

numbers of the Bushmen in the north and east are not accurately known. Minerals, especially diamonds, make up the bulk of the export trade, but the large animal population, numbering 4 million sheep and goats (mainly in the south) and 1,500,000 cattle (mainly in the north), plays a greater part in the life of the people.

The Namib. The scarp of the plateau is not nearly so well defined in South-West Africa as it is in the east. The part below the scarp known as the Namib is very dry, and of desert-like character. Often there is no vegetation at all. The coast has two ports, Walvis Bay, with a small but good natural harbour, and Luderitz, which became of importance as the result of a discovery of alluvial diamonds near the coast.

Great Namaqualand. The country above the scarp is rocky or sandy and covered with scrub vegetation. It is essentially a cattle country, and depends on subterranean water-supply. The capital of South-West Africa is Windhoek, situated in this region. Copper, vanadium, and tin have been worked in the north of the country.

The Kalahari. The Kalahari occupies the whole of the north and east of the country. In places there are salt pans of which Etosha Pan is the largest. Few crops are possible, maize is the chief. The main railway lines in the territory run from Walvis Bay and Luderitz to join the Union main line at De Aar.

THE FEDERATION OF RHODESIA AND NYASALAND

This Federation was set up in 1953-54 and consists of the self-governing colony of Southern Rhodesia and the protectorates of Northern Rhodesia and Nyasaland.

SOUTHERN RHODESIA

Size, Position, and History. Southern Rhodesia has an area of rather over 152,000 square miles, or larger than the Transvaal and Natal together. It lies wholly within the Tropics and stretches from the Limpopo River in the south to the Zambezi River in the north. Southern Rhodesia has no sea coast, being separated from the Indian Ocean by the Portuguese territory of East Africa. Consequently all the foreign trade with countries outside Africa must pass through other countries before the coast is reached; actually most of the trade passes through the Union of South Africa to Cape Town, or through the Portuguese port of Beira. Rhodesia takes its name from C. J. Rhodes, who was mainly responsible for the addition of the whole territory to the British Empire. In 1888, Lobenguela, King of the Matabele nation, entered into a treaty of peace with Great Britain and granted mineral concessions (the Rudd Concession) to a group of men who next year founded the British

South Africa Company. The Company was given its Royal Charter by the British Government in 1889. The Company organized a pioneer expedition which founded Salisbury in 1890. Both Northern and Southern Rhodesia were administered by the Company until 1923, when Southern Rhodesia (comprising the two provinces of Matabeleland and Mashonaland) became a self-governing British Colony. In 1924 Northern Rhodesia became a British Protectorate.

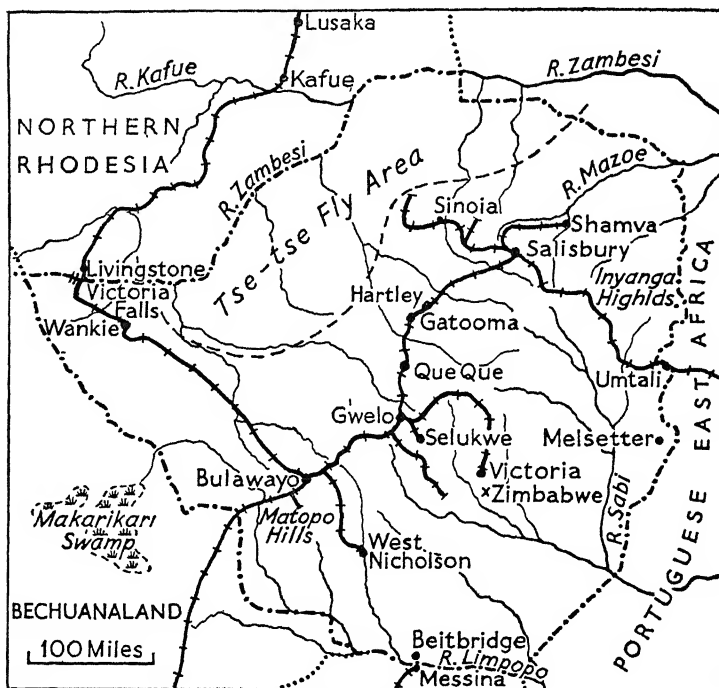


FIG. 125.—Southern Rhodesia.

Physical Features. The whole of Southern Rhodesia lies on the great African Plateau. Running across the country from south-west to north-east is a broad belt of land more than 4,000 feet above sea-level. On either side of this central plateau the land slopes away gently, on the north-west towards the Zambezi River, on the south-east towards the Limpopo. Both along the north-western and the south-eastern borders there are thus broad strips of land less than 3,000 feet above sea-level and even as low as 1,000 feet. Broadly speaking, the northern half of the territory lies in the Zambezi basin, the southern half in that of the Limpopo. In the north-west of the colony lie the famous Victoria Falls, where the great Zambezi River plunges over a ledge a mile wide into a chasm 360 feet

deep. Just as in the Union of South Africa, the plateau is highest in the east, along the borderland between Rhodesia and Portuguese East Africa. Generally the surface of the plateau is gently rolling, occasionally interrupted by low ranges of granite hills, such as the Matopos near Bulawayo. In the eastern districts, however, round Umtali and Melsetter, the country is mountainous, for the edge of the plateau has been cut up by deep valleys.

Climate. Southern Rhodesia may be divided into two climatic divisions:

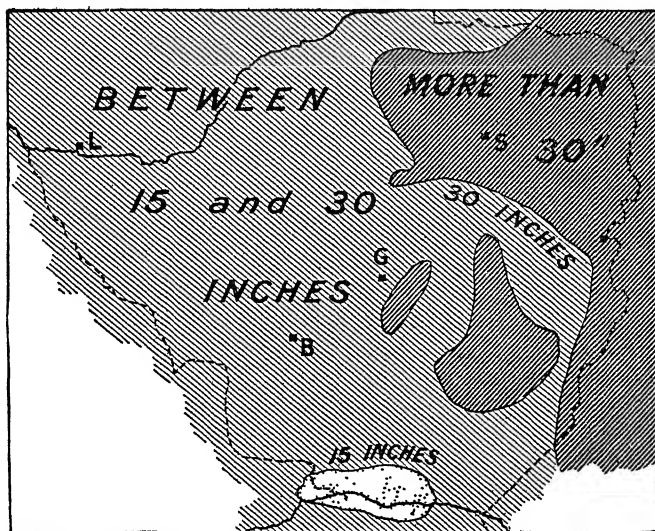


FIG. 126. Rainfall map of Southern Rhodesia.

(1) Land below 3,000 feet. The climate is tropical, frosts are rare or absent, malaria is of common occurrence, and Europeans usually feel the strain consequent upon living in a tropical climate.

(2) Land above 3,000 feet. The climate is sub-tropical, light frosts are common in the cold season, the region is healthy and very suitable for European occupation.

As in the Transvaal, there are two seasons in Rhodesia, the "Wet Season" from October to the end of March and the "Dry Season" from April to the end of September. The rain-bearing winds, as in the Transvaal, come from the east, that is from the Indian Ocean, so that the rainfall is heaviest on the east and decreases gradually westwards. Over most of the country it is between 15 and 35 inches. After the rains many of the tributaries of the

Zambezi and Limpopo form river courses 100 yards and more in width, but in the dry season many of them are completely dry.

Geology and Minerals. Two-thirds of Rhodesia is built up of a complex of granite and old hard rocks. In the broad Zambezi and Limpopo valleys these rocks are covered by coal-bearing Karroo sandstones and shales. Scattered through the old rocks are numerous goldfields, and gold is one of the leading exports. Rhodesia ranks high in world production of chrome, nearly all of which comes from a single area near Selukwe. Also, Rhodesia is second in the list of countries producing asbestos, and has large reserves of this mineral. Copper has declined in importance since the rapid expansion of mining in the Katanga region of Northern Rhodesia and Belgian Congo. Although several coalfields are known, nearly all the coal at present is obtained from Wankie, on the railway between Bulawayo and Victoria Falls. Large quantities are sent to the mining districts of the Katanga.

Natural Vegetation. Except in the eastern mountains where there are wet evergreen forests and mountain forests, nearly all the whole of Rhodesia is covered with savana and savana forests. It is mainly in the west and in the valley of the Zambezi that the trees are sufficiently large to be cut for timber. Two of the most important timbers are Rhodesian teak and Rhodesian mahogany.

Agriculture—Animals. Southern Rhodesia is a cattle country rather than a sheep country. There are huge ranches where beef cattle are reared, but dairy-farming is of increasing importance along the railway from Bulawayo to Gwelo and Salisbury, each of which has a creamery. Strenuous precautions are taken to prevent disease, particularly rinderpest. The north-western region is subject to tsetse fly. Pigs and poultry also do well in the country.

Agriculture—Crops. Maize is the staple crop and occupies four-fifths of the cultivated land. Tobacco does well on the light sandy soils overlying the granite and is easily the country's leading export. There are still tremendous opportunities for crop-farming in Rhodesia. Among other crops suitable to the climate are cotton, ground-nuts, sunflowers (the seeds of which yield oil), beans and fibre plants, as well as vegetables for local use. Citrus fruits grow well and oranges are being exported to Europe.

Population. Southern Rhodesia is capable of supporting a very much larger population than exists at present and the country is developing rapidly. Of the 2,000,000 Africans, nearly half are employed by, or dependent upon those employed by, the Europeans. The leading occupations are stock-rearing, agriculture, and mining. Especially since the Second World War there has been a rapid increase in Europeans by immigration, especially into the towns. In 1952 the white population was about 150,000; in 1957, 200,000.

Salisbury is the capital, and is fast becoming an important industrial centre for the preparation of bacon, flour, biscuits, oil

candles, tobacco, leather, and other products depending on the local supplies of raw material.

Bulawayo is the gateway to Rhodesia from the south: the railway from Bulawayo to Cape Town is operated by the Union railways, and the journey is performed in under three days without change of train. Bulawayo is the junction for the line to Wankie, Victoria Falls, Northern Rhodesia, and the Belgian Congo. It is also the headquarters of the Rhodesian railways.

Gwelo lies roughly halfway between the towns of Bulawayo and Salisbury and is the collecting centre of the rich farming districts of the Central region as well as of the gold-mining area. Actually Southern Rhodesia is divided into two provinces, Mashonaland in the north and Matabeleland in the south and west, but the people in the country often refer to the central parts around Gwelo as the Midland Province. *Que Que* has grown up as a new iron and steel town.

Umtali lies on the extreme east, very close to the Portuguese territory, and amongst the most mountainous parts of Rhodesia. It lies on the railway from Salisbury to the port of Beira, and so deserves the title of the "eastern gateway of Rhodesia."

Southern Rhodesia is unfortunate in that it has no coast line. The nearest port is Beira in Portuguese East Africa, but much of the foreign trade passes through the Union of South Africa to Cape Town.

Among other attractions which bring large numbers of visitors to Southern Rhodesia every year are the famous Victoria Falls on the Zambezi River, the various ruins, remnants of a former civilization, such as those at Zimbabwe, near Fort Victoria. Rhodes, the pioneer of Rhodesia, and his able helper, Sir Starr Jameson, lie buried in the lonely Matopo Hills, about twenty miles from Bulawayo.

Railways. The Beira, Mashonaland, and Rhodesian railways are built on the same gauge as the South African railways in the Union. The main line is from Beira to Salisbury, Salisbury to Bulawayo, and from Bulawayo across the wonderful bridge, now used also as a road bridge, at the Victoria Falls to Northern Rhodesia and the Congo. Before the country can be adequately developed, many more railways are needed, but the huge Kariba hydro-electric power works, completed 1960, on the Kariba gorge of the Zambesi where it forms the boundary between Southern and Northern Rhodesia marks a great advance.

NORTHERN RHODESIA

The vast territory of Northern Rhodesia, which is larger than the whole of the Cape Province, was first brought to the notice of Europeans through the explorations of the famous Scottish medical missionary, Dr. David Livingstone. Livingstone discovered the

Victoria Falls in 1855. The most important tribe of Northern Rhodesia is the Barotse, and Lewanika, then the great chief of the tribe, sought the protection of the British over seventy years ago. In 1899 he gave the British South Africa Company mineral and trading concessions over the whole of his dominions. Northern Rhodesia has been administered as a British Protectorate since 1924.

Physical Features. Northern Rhodesia lies almost entirely on the high African plateau and stretches from the Zambezi to the southern end of Lake Tanganyika.

Climate. The country is entirely within the Tropics, but most of the surface is more than 3,000 feet above sea-level and so comparatively cool. Even in the south the temperature rarely drops to freezing-point and rarely rises above 100°; at Livingstone the average for the year is 73°. The whole country lies in the summer rainfall region and everywhere enjoys a sufficient rainfall.

Geology. Much of the surface is covered by old hard rocks, rich in minerals. Important deposits of silver, lead, and vanadium ores are found at Broken Hill, but by far the most important minerals are the copper ores of the Katanga, a zone extending into the Belgian Congo. Only discovered in 1927-28, they have risen rapidly to a position of world importance, and several great mines and smelting plants now produce copper for export mainly to Britain and Europe. The centre of the mining district is Ndola.

Natural Vegetation. The predominant natural vegetation is the African savana, grassland with scattered trees. In many parts the trees become much more numerous, and the result is a forest with an undergrowth of grass. Timber, mostly of hard woods, such as Rhodesian teak and Rhodesian mahogany, is worked in the country north of the Zambezi to the west of Livingstone.

Agriculture. Northern Rhodesia has shot ahead in recent years as a result of mining developments, but is also a cattle-ranching and farming country with great prospects. Maize is the chief crop at present, but Kaffir corns (sorghums), wheat, and oil seeds are also grown. Cotton-growing is likely to become important; citrus fruits, tobacco, and fibre-yielding plants all do well. The northern parts are still infested with the tsetse fly, but in the south cattle are reared. The mining communities purchase much of the agricultural produce.

Population. At the 1951 Census fewer than 2,000,000 people were scattered over Northern Rhodesia's 288,000 square miles. Europeans numbered 37,000.

Livingstone is the principal town and was, until 1935, the capital. It is only a few miles from the Victoria Falls, on the borders of Southern Rhodesia. Various agricultural settlements are scattered along the railway, which runs through the country from Victoria Falls to the Belgian Congo. Fort Jameson, near the Nyasaland

frontier, and Abercorn, near Lake Tanganyika, are other farming centres far from the railway. The present capital is Lusaka, on the railway.

NYASALAND

The third member of the Federation of Rhodesia and Nyasaland, though by far the smallest (37,000 square miles), has the largest population (2,400,000). It is a long, narrow country, bordering the western shore of Lake Nyasa and stretching to the south of the lake. There are tracts in the rift valley containing the lake which are below 3,000 feet, but the greater part of the protectorate lies on the great African plateau at an elevation of 3–5,000 feet, with mountain massifs both in the far north and the far south rising to 8,000 feet. Economic development has lagged behind that of the Rhodesias, being mainly agricultural and dependent, commercially, on European plantations in the Shiré Valley, by which Lake Nyasa drains to the Zambezi. Tobacco and tea are the outstanding exports; cotton-growing has been encouraged and provides from one to two thousand tons; other exports include tung oil and soya beans.

Nyasaland is shut off from the sea, but is in direct railway communication, through Portuguese East Africa, with the port of Beira; Zomba, the seat of government, and Blantyre, the commercial capital, are both small towns. It is hoped that the inclusion of the protectorate in the Federation will assist its material development by linking it with greater financial resources.

EAST AFRICA

Physiographically East Africa consists of two parts:

- (a) A portion of the great plateau of Africa.
- (b) The coastal lands between the plateau and the sea.

East Africa is divided between the British Colonies or Protectorates of Uganda, Kenya, and Nyasaland, the British Trustee Territory of Tanganyika, and the Portuguese Colony of Portuguese East Africa. Uganda, Nyasaland, and most of Tanganyika lie on the plateau; Kenya is half on the plateau and half on the coastal lands; Portuguese East Africa is mostly on the lowlands of the coast.

THE BELGIAN CONGO

The Belgian Congo occupies the greater part of the basin of the great Congo River. The basin forms a saucer-shaped depression in the surface of the plateau of Africa. The floor of the "saucer" is about 1,000 feet above sea-level. The Congo and many of its tributaries rise in the south on the high plateau of South Africa. The main river drops into its basin by a series of rapids or falls, and

flows northwards as a navigable waterway as far as the Stanley Falls. From the Stanley Falls the river swings westwards and is

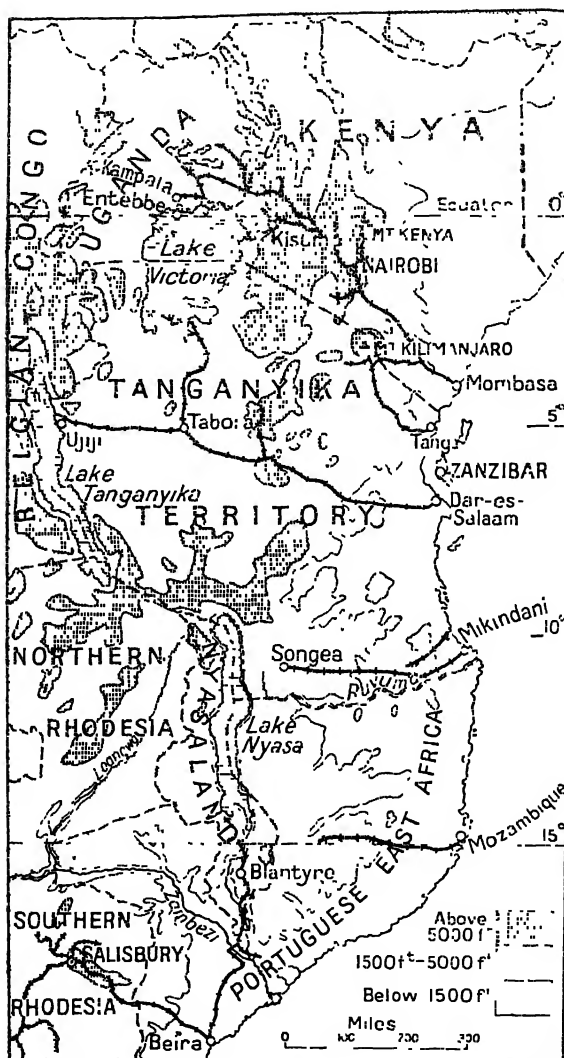


FIG. 127.—East Africa.

Near Mikindani is the new port of Mtwara.

navigable as far as Stanley Pool. Then the river drops rapidly by a series of rapids to the coast. Compare this with the River Nile. The equator passes through the Congo Basin, and so the basin has a

high temperature with heavy equatorial rains. All the lowlands are covered with dense evergreen forests. The highlands surrounding the basin, and sometimes the ridges between the rivers, are covered with savana or grassland.

The Forest is thinly peopled, largely owing to difficulties in clearing. It is in these dense forests that the pygmies live. Elephants are still numerous, and ivory is an important product. Wild rubber was formerly of considerable importance, but ruthless exploitation has diminished the supply. The oil palm yields palm oil and palm kernels, used in soap-making. Copal is a sticky substance, rather like resin, obtained from certain trees.

Katanga, a portion of the plateau on the south, has become very important because of its rich mineral deposits. Copper is the chief metal, and Elisabethville the chief mining centre. Coal and food for



FIG. 128.—Section across Africa roughly along the Equator, showing the Congo Basin and the High Plateau of East Africa.

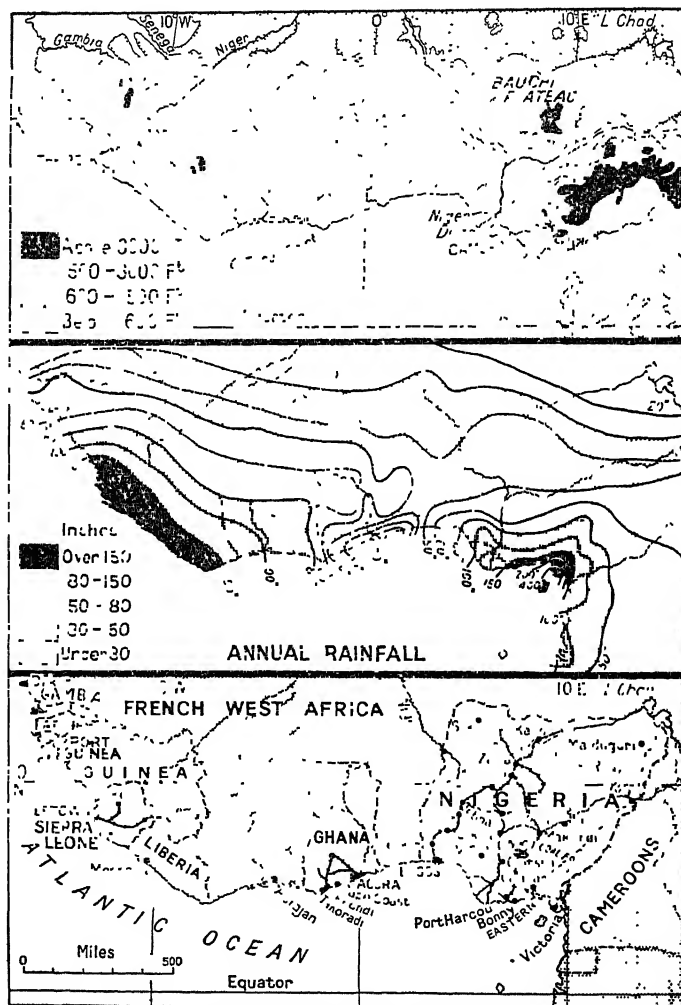
the miners are obtained partly from Rhodesia but there is an important local development of water power. Notice that Katanga lies right in the heart of Africa, and that the copper-mining region extends into Northern Rhodesia. There are at present four main ways in or out. The chief is by railway through Rhodesia to Beira, a second is by rail and river to the Congo mouth, and a third is across Lake Tanganyika and the Territory of Tanganyika to Dar-es-Salaam. The fourth, and most direct, route is by railway to Benguela and Lobito Bay, in Angola.

Communications. The earlier railways were built to circumvent rapids on the rivers. One is from the port of Matadi to Leopoldville; another is round the Stanley Falls. The short railway joining the Congo and Lake Tanganyika should also be noted. Parts of the Lualaba, the Congo, and the Kasai rivers are navigable.

ANGOLA

Angola is larger than the four provinces of the Union of South Africa, but has a much smaller population. It has been a Portuguese possession since 1575, but very little development has taken place. Yet there are huge areas of good grassland on the plateau, and cattle-rearing is likely to become important. Maize, coffee, and cotton are grown, and diamonds and copper are known to exist. The railway recently constructed—from Lobito Bay and Benguela to the

Katanga mining district of the Belgian Congo—is largely due to British enterprise. It affords an important new “side-door” into Africa.



Figs. 129-131 West Africa.

WEST AFRICA OR THE GUINEA COAST

From Cape Verde in latitude 15° N. to the mouth of the River Congo in latitude 6° S. is roughly 3,000 miles. Along this coast there are four Commonwealth countries and two British Trustee territories,

is lower and the natural vegetation is savana. The crops grown are mainly for the use of the natives—millet, maize, and rice for food and cotton for clothing—with ground-nuts for exports.

The old rocks of the plateau are sometimes rich in minerals; much tin is obtained from Nigeria, gold and manganese from Ghana, iron-ore from Sierra Leone, and coal from Nigeria.

THE AFRICAN COAST OF THE MEDITERRANEAN

That part of the continent of Africa which abuts on the Mediterranean Sea falls at once into two parts which are distinct physiographically, structurally, and climatically.

(1) The eastern half lies between latitudes 30° and 33° N., and here the real Africa, the continent of plateaus, reaches the coast.

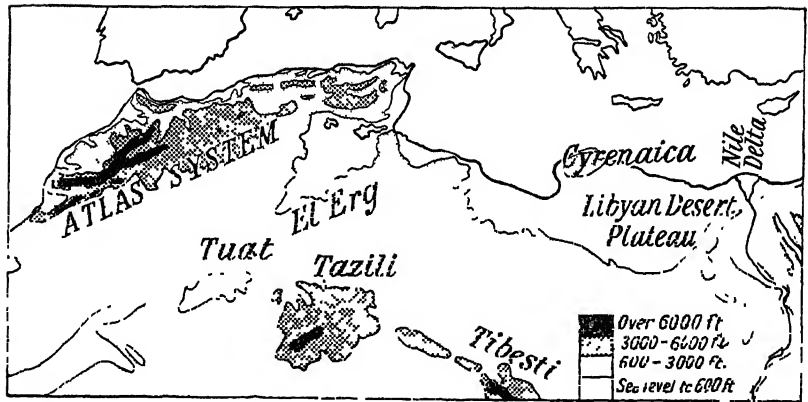


FIG. 133.—North Africa—physical.

Vast stretches of almost unfolded Secondary and Tertiary sediments obscure the underlying platform of ancient rocks. Here, too, the greatest desert in the world reaches the very shores of the Mediterranean, for the Atlas lands act as a shield from the rain-bearing westerlies even in winter. No part has 20 inches of rainfall per year (Alexandria 8 inches; Tripoli 16 inches). Politically the eastern third of the coast-line lies in Egypt; the western two-thirds in the independent kingdom of Libya created in 1951 (including Cyrenaica, Tripolitania, and Fezzan). The normal character of the coast-line in Egypt is interrupted by the great delta of the Nile.

(2) The western half lies almost entirely north of latitude 35° . It is occupied by the great complex chain of the Atlas and Anti Atlas Mountains, and these Atlas lands are structurally more closely allied to Europe—of whose Alpine Folds the Atlas are part—than to Africa. Moreover, the climate is essentially Mediterranean and

large tracts are well watered. In recent years the former French protectorates, Morocco and Tunisia have become independent; Algeria remains French. The discovery of vast oil resources on the Algerian-Libyan borders has altered the economic prospects of the whole.

EGYPT

Most of the independent republic of Egypt is a desert. The total area is 383,000 square miles—more than three times the whole of the British Isles—but the settled and cultivable area (the Nile Valley, Delta, and Oases) covers only about 13,600 square miles, or a little over a quarter the area of England, though 20,000,000 people live there.

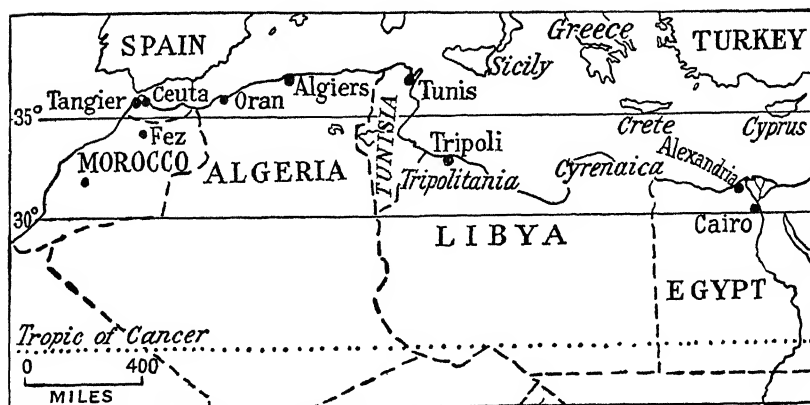


Fig. 134.—North Africa—political.

The Nile Valley is a flat-bottomed valley, about 10 miles wide and bounded by cliffs on either side. The character of the cliff-like boundaries of the valley is important, because it prevents any lateral extension of the irrigated areas. The Nile Valley in Egypt averages 1,500 people to the square mile.

Fertile Egypt falls into two parts.

- (a) The Nile Valley, or Upper Egypt.
- (b) The Nile Delta, or Lower Egypt.

Upper Egypt. In the old days Upper Egypt used to be made fertile by the annual floods of the Nile, which spread a layer of fine silt as well as water over the land. It should be noted that the Nile of Egypt is formed by the junction, in the Sudan, of the White Nile and Blue Nile. The White Nile rises near the Equator and is an almost constant stream; the Blue Nile rises amongst the mountains of Ethiopia and after the summer monsoon rains and melting of the

snow there, comes down in flood at the end of the summer in August or September. The Valley of the Nile in Egypt was divided up into a number of compartments rather like rice-fields with high banks. This prevented the water flowing quickly, and was called basin irrigation. Now the valley is largely irrigated by canals from the great dam at Aswan and other storage works (barrages at Esna and Asyut).

Lower Egypt, or the Nile Delta, is also watered by canals with a great barrage at Zifta. But here some marsh land still waits to be

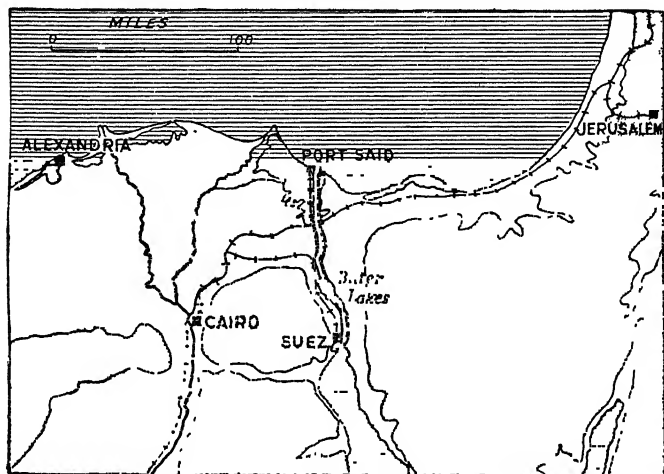


FIG. 135.—The Suez Canal.

Notice that there is no high land near, and so there are no locks on the canal.
The highest land passed through is only 50 feet above sea-level.

reclaimed. The delta is on the borders of the Mediterranean and may get a little rain in winter.

The great cash or export crop of Egypt is cotton (which occupies a larger area than any other crop), including the excellent Sakellaridis variety. The great food crops are maize, wheat, barley, and beans. A little sugar-cane and rice are grown.

Desert Egypt falls into two parts—the Libyan Desert on the west and the Arabian Desert on the east. Amongst the famous oases of the former that of El Faiyum occupies a hollow below sea-level. Apart from the dates of the oases, phosphate is mined in some areas and some 2,000,000 tons a year of oil obtained from oilfields on the shores of the Gulf of Suez and the Peninsula of Sinai.

Cairo is the capital and largest town in Egypt. It is situated at the head of the delta, on the borders of Upper and Lower Egypt, and so was a convenient centre from which to govern the whole of

the long, narrow country. The tourist traffic has long been an important national asset to Egypt.

Alexandria is the principal port, but it suffers from mud filling up the channels. Raw cotton forms nearly nine-tenths of the exports of Egypt; cotton seeds are also exported. Egypt cannot grow enough food for her big population, and imports food-stuffs as well

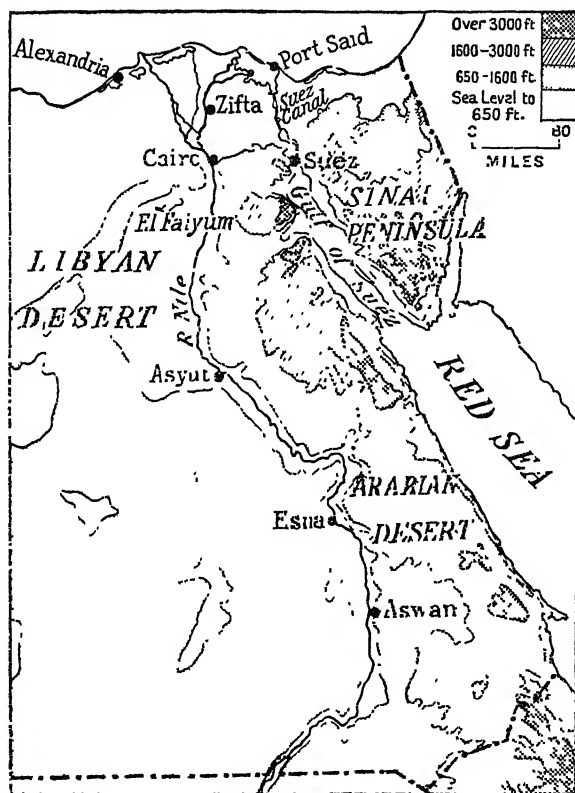


FIG. 136.—Egypt.

as coal, wood, cotton goods, and iron and steel manufactures. Although cotton is almost the only export of Egypt, the value of cotton exported is less than that exported by India. Notice carefully the communications of Egypt, especially the way in which the rail-ways have been built where the river cannot be used.

The **Suez Canal** lies in Egyptian territory. It cuts through a flat strip of desert, the isthmus between Egypt and Sinai. The canal is roughly 100 miles long, but part of that distance is through the Bitter Lakes. At the northern end is Port Said, on the Mediterranean; at the southern end is Suez, on the Gulf of Suez. The

canal was built by the French engineer De Lesseps, and finished in 1869. It has since been enlarged, but still limits the size of vessels trading between Europe and the East. There are no locks, and the canal is open to the sea at both ends. The Suez Canal was owned by the Suez Canal Company, in which the British Government had some shares, other shares being held by the French, but the Canal was nationalized by Egypt in 1956. Over 15,000 steamers pass through the canal in a year; a third of the tonnage is British.

LIBYA

Italy annexed Libya from Turkey in 1911–1912. Libia Italiana was divided for administrative and military purposes into two districts, Tripolitania and Cyrenaica, with capitals respectively at Tripoli and Benghazi. The boundaries were later extended slightly east and west, and effective occupation extended farther south in 1928. Tripolitania has an area of roughly 300,000 square miles, Cyrenaica about the same. But little over a million people live in this vast area—a mixed population of Arabs, Negroes, and Jews. Libya was Italy's chief colonial possession, yet it is doubtful whether more than a million Italians could have found land suitable for settlement (there were in 1931 less than 45,000).

The northern coastlands of Libya became a battleground during the Second World War. After a period of military occupation by the British (and by the French in Fezzan) the whole became an independent kingdom. Opinions differ regarding the possibilities of Libya: Cyrenaica is said to have pastures suitable for cattle and land suitable for bananas, wine grapes, barley, and dates. Tripolitania, in particular, can be divided into three belts:

(1) The Mediterranean, further divisible into:

(a) The coastal oases, in which thrive the date palm, olive, orange, and other Mediterranean plants;

(b) The steppe belt, said to be suitable for cereals and pasture:

(c) The dunes, which are being afforested with acacia, poplar, etc.

(d) The mountains, on the slopes of which fruit trees will grow.

(2) The sub-desert, growing the alfa plant, suitable for cellulose (artificial silk) making.

(3) The desert includes some fertile oases, and there is still a large caravan trade across the Sahara to the Central Sudan.

Along the coasts of Libya sponge and tunny fishing are important.

THE MEDITERRANEAN OR BARBARY STATES

The Atlas region of North Africa lies within the political divisions known as Morocco, Algeria, and Tunisia. In the east, in Tunisia and Algeria, the Atlas system comprises two main mountain belts,

the Tell Atlas and the Sahara Atlas, separated by a plateau, the Plateau of the Shotts. In Morocco the Tell Atlas curves away northwards as the Rif Mountains, the Great Atlas trends west-south-west, whilst the Sahara Atlas is prolonged as the Anti Atlas. These divisions are shown in Fig. 137.

It will be seen that in general three broad divisions may be distinguished.

- (a) The coastal strips or coastal plain.
- (b) The main mountain chains and the intervening plateaus.
- (c) The Sahara region in the south.

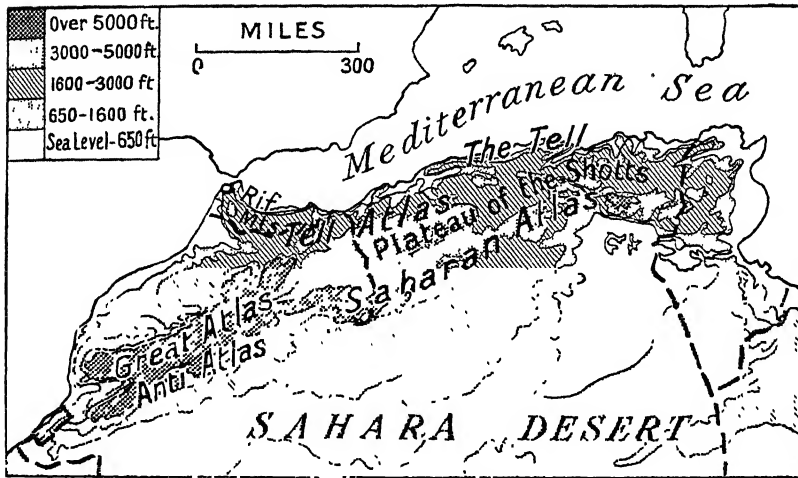


FIG. 137.—Physical map of the Barbary States.

The rain-bearing winds of the winter come from the west, and so Morocco, on the west, enjoys the best rainfall.

Morocco. The old Mahommedan Empire of Morocco is now a sovereign independent monarchy. Until 1956 it was divided into three political zones.

- (a) The international zone, around the port of Tangier on the strait of Gibraltar.
- (b) The Spanish zone, lying between Tangier and the French zone, about 60 miles wide.
- (c) The French zone, comprising the remainder and the main part of the country.

In 1956 France, Spain, Britain and other countries concerned all gave up their rights.

Tangier, with a mixed population of Moors, Jews, and Europeans, is the natural port of Morocco, and is only $1\frac{1}{2}$ hours by steamer from Gibraltar.

The Northern Zone includes two ports which are Spanish possessions, Ceuta, and Melilla. This northern zone includes the wild, mountainous country inhabited by the turbulent Riffs. Motor roads connect Tangier with Tetuan and Ceuta, and Tangier with the Southern zone, but as a whole the zone is relatively undeveloped.

The Southern Zone is a large and important tract. The French showed amazing energy in the construction of towns and ports (such as the new towns adjoining the old cities of Rabat, Casablanca, Marrakesh, Fez, and Meknes), of motor roads, and to less extent of railways. It is important to notice that Morocco on gaining independence inherited many advantages including the great port of Casablanca. The country may be considered under the following regions:

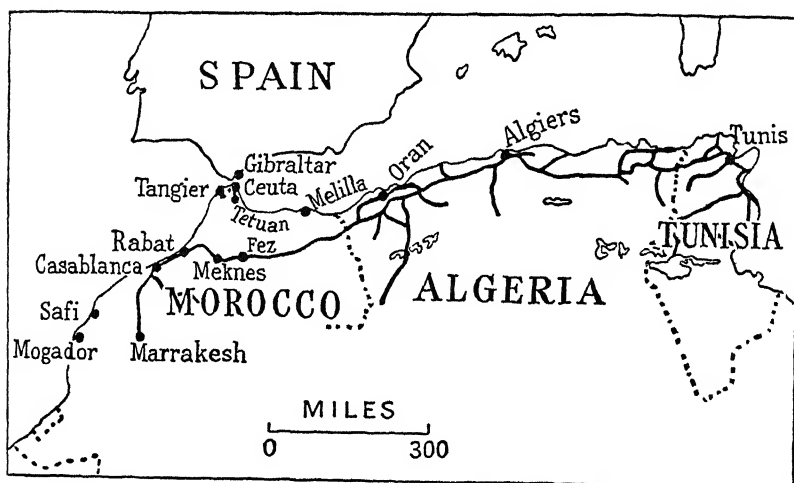


FIG. 138.—The Atlas region—railways.

The Coastal Plains are fertile; barley, wheat, and maize are widely grown. Huge numbers of Mediterranean fruit trees also exist—olives, vines, figs, oranges, etc. Numerous cattle are reared. Nearly one-half of the people of Morocco live in this fertile plain. Casablanca is the chief town and port. Rabat, a less favoured port, is the usual residence of the sultan; Safi, and Mogador are open roadsteads farther south. Meknes and Fez are important inland trading centres. Behind the coastal plain, but before one reaches the Atlas Mountains, is a low plateau called the Meseta. Except near the hills, where there is water for irrigation, it is largely too dry for crops. But there are large numbers of sheep and cattle. On the Meseta is Marrakesh (or Morocco), an important market.

The Atlas Mountains and Enclosed Plateaus. The mountains are often covered with forests of cork-oak, cedar, etc. The plateaus are capable of but limited development.

The Sahara has a number of oases with date palms.

Morocco is now continuing to develop rapidly. Whilst the chief industry is agriculture and the chief export agricultural produce Morocco is rich in minerals. The chief exports to date are phosphates, with some anthracite and iron ore. The exports include eggs, wheat, barley, and wine.

Algeria has developed rapidly under French influence. It has in fact been constituted politically an integral part of France.

The Coastal Strip, lying between the crest of the mountains and the sea, is known as the Tell, and is the most important part of the country. The valleys and plains have good soil, but usually require to be irrigated. Large quantities of wheat and barley are grown, as well as the vine and various fruits. Wine is easily the chief export. The progressive farms are mainly owned by Europeans. The hills are covered with forest or scrub forest, the most important trees being cork-oak, pine, and cedar. The higher parts of the hills are suitable for sheep-rearing. Along the coast sardine fisheries are important. The principal towns and ports are Algiers and Oran, the largest inland town is Constantine.

The Plateau between the Tell and the Saharan Atlas is known as the Plateau of the Shotts, a shott being a shallow lake which dries up in the hot season. The plateau is covered with poor grass on which feed many sheep and goats. The inhabitants are nomads, and move about with their flocks in search of good grass. The alfa grass (esparto) is exported for use in paper-making.

The Sahara has several oases, and the French have sunk artesian wells and made it possible to extend the fertile area. The great product is the date, but now the rich oilfields are changing the whole economic position. A pipe line to the port of Bougie was completed in 1959 when oil began to flow.

Iron ore and phosphate are mined in Algeria, and other minerals in smaller quantity. The trade is mainly with France.

Tunisia, like Morocco, was a French Protectorate. It forms a continuation eastwards of Algeria, and may be divided into the same regions, but the Plateau of the Shotts is much narrower. The principal town is Tunis, near which are the ruins of Carthage. It became independent in 1956.

EXERCISES

1. Population of South Africa. A Census is taken every ten years. The population tables and the statistics may be kept up to date from the *Statesman's Year Book* or the *Year Book of the Union of South Africa*.

2. Most of the statistics given in this Chapter may be kept up to date from the *Statesman's Year Book*.

EXAMINATION QUESTIONS

1. Give a geographical description of the Congo Basin and refer in particular to the chief exports of the Belgian Congo.
2. Describe the course of the Nile and give an account of the part it plays in the economic life of Egypt and the Sudan.
3. Consider to what extent the main types of climate are repeated in Africa north and south of the equator.
4. What reasons have you for believing that the "Cape-to-Cairo Railway" may never be as great a commercial highway as either of the transcontinental railways of Canada?
5. Divide *either* South-West Africa *or* Natal into natural regions, explaining your division and adding brief notes on the life of each region.
6. Give an account of the rivers of British South Africa, grouping them according to their value, present or potential, to Man.
7. Discuss the main lines of communication between different parts of the Union of South Africa with special reference to geographical features.
8. What geographical conditions are necessary for sheep-farming? Illustrate your answer by special reference to South Africa and Canada.
9. Discuss the importance of railway transport in Africa east of a line joining the mouths of the Nile and Congo, and indicate the main directions in which it is likely to develop.
10. In what respects has the economic development of Africa south of the equator been assisted or retarded by the historical circumstances of its occupation by European peoples?

CHAPTER IV
AUSTRALIA AND NEW ZEALAND
GENERAL CONSIDERATIONS

THE island-continent of Australia lies wholly in the Southern Hemisphere and is the only continent so situated. The general term "Australasia" is sometimes used to include Australia, New Zealand, and certain other important land masses within the south-west quadrant of the Pacific Ocean. The somewhat older term,

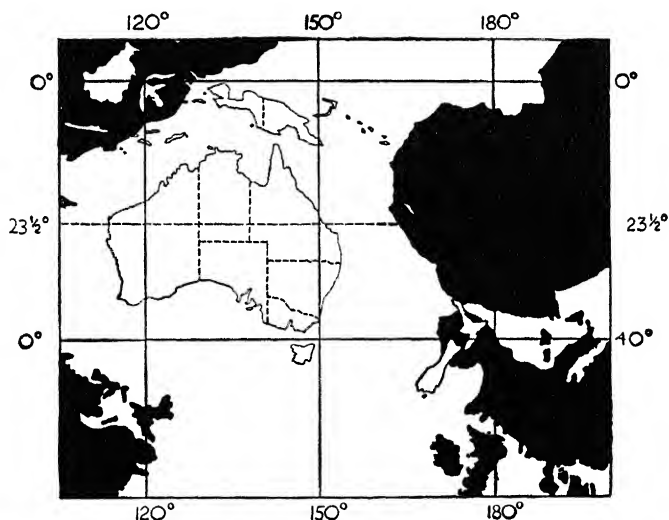


FIG. 139.—Australia and New Zealand. The position of important lines of latitude and longitude. The black areas are the land of the opposite side of the world.

Oceania, includes in addition the multitude of small islands scattered over the surface of the Pacific Ocean, some of which, it should be noted, lie north of the equator. The principal land masses included under Oceania are therefore:

(a) Australia which, together with the large island of Tasmania and various small islands round the coasts, constitutes the Commonwealth of Australia. Australia is the largest island in the world, excluding, of course, the continental masses of Antarctica, the Americas, and Eurasia-Africa.

(b) The two large islands, the North Island and the South

Island which, together with Stewart Island and a number of small groups, constitute the Dominion of New Zealand.

(c) The large island of New Guinea and Papua.

(d) A very large number of small islands scattered over the Pacific Ocean, collectively known as Polynesia (eastern portion), and Melanesia (western portion).

A number of islands lying north of Australia and forming part of the East Indies are usually considered as Asiatic islands, but sometimes as Australian.

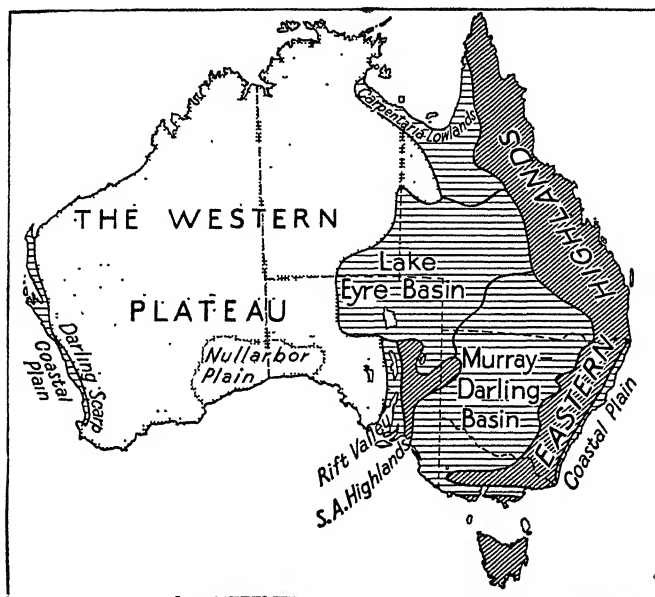


FIG. 140.—The main physical regions of Australia.

Except part of New Guinea and a number of the islands of the Pacific, and the East Indies, the whole of Oceania forms part of the British Empire.

Fig. 139 shows the important lines of latitude and longitude in Australia. The Tropic of Capricorn cuts right through the centre of Australia, so that rather less than half lies in the Tropics and rather more than half in the Temperate Zone. The important states of New South Wales, Victoria, Tasmania, and South Australia, as well as the greater part of Western Australia, lie within the Temperate Zone. The line of latitude of 40° S. passes between Tasmania and the mainland of Australia and also through the North Island of New Zealand. This is important because the Mediterranean regions of the world lie mainly between latitudes 30° and 40° .

In certain respects Australia and New Zealand suffer through distance from the populous lands of Europe which form their chief markets. It is roughly 11,000 miles from London to Melbourne via Suez or London to New Zealand via Panama.

The area of the Australian Commonwealth is roughly 3,000,000 square miles or approximately the same as the United States excluding Alaska. New Zealand, with 104,000 square miles, is larger than Great Britain but smaller than the British Isles. The following table is for reference purposes:

	Area in square miles			Population	
	Whole	Tropics	Temperate	Census 1921	Census 1952
Commonwealth . . .	2,974,581	1,149,320	1,825,261	5,435,734	8,986,530 ¹
Queensland . . .	670,500	359,000	311,500	755,972	1,318,259
N.S.W. . . .	309,433	—	309,433	2,100,371	3,423,529
Victoria . . .	87,884	—	87,884	1,531,280	2,452,341
S.A. . . .	380,070	—	380,070	495,160	797,094
W.A. . . .	975,920	364,000	611,920	332,732	639,771
Northern Terr. . .	523,620	426,320	97,300	3,867	16,469
Tasmania . . .	26,215	—	26,215	213,780	305,752
Federal Capital Terr. . . .	939	—	939	—	30,315
New Zealand . . .	103,862	—	103,862	1,218,913	2,172,350 ²
Papua	90,540	90,540	—	White ³ 7,000	Native ³ 488,000
Br. New Guinea . .	93,000	93,000	—	12,500	1,230,000
Dutch New Guinea .	160,692	160,692	—	500	750,000
Br. Solomon Isles .	12,400	12,400	—	600	100,000
New Caledonia . .	8,548	8,548	—	22,000	43,000 ⁴
Fiji	7,083	7,083	—	9,500	336,000
Hawaii	6,441	6,441	—	82,000	418,000
New Hebrides . .	5,700	5,700	—	1,700	52,000 ⁴
W. Samoa . . .	1,250	1,250	—	5,000	92,000
French Poss. in Oceania . . .	1,520	1,520	—	63,000	—
Other Isles . . .	2,666	—	—	—	—
Total, Oceania, app. . . .	3,470,000				

¹Excluding 40–50,000 aboriginals ²1956 ³Estimated. ⁴Including Asiatics.

AUSTRALIA

Physical Features. Roughly three-quarters of the land mass of Australia lies between the 600 and 1,500-foot contours. The continent may be divided simply into three units (Fig. 140):

- (1) The Western Plateau.
- (2) The Eastern Highlands.
- (3) The Central Lowlands.

The Western Plateau occupies nearly two-thirds of the whole of Australia, and is almost entirely more than 600 feet above sea-level. It includes the whole of Western Australia, much of South Australia, and most of the vast Northern Territory. Along part of the west coast, as in the neighbourhood of Perth, there is a narrow coastal plain, but along the south the plateau reaches the coast itself and gives rise to cliffs. In the interior and along the south coast there are no rivers; the Trans-Continental Railway, which crosses the southern part of the plateau, runs for over a thousand miles without crossing a single permanent watercourse.

The Eastern Highlands vary greatly in character in their course from Cape York in the extreme north to the vicinity of Mount Gambier in the south. In general, however, they present a steep face to the seaward and have a long, gentle slope inland towards the Central Lowlands. Along much of the coast of Queensland the mountains reach the coast; farther south, in New South Wales, there is usually a narrow coastal plain. In Victoria the main ranges turn westwards, and parallel ranges are developed farther south. Tasmania is a mountainous island, forming a detached mass of the Eastern Highlands. In view of the steep eastern face, very important are the gaps which occur at intervals in the highlands, and they have played a leading part in the development of communications and coastal towns. The Cassilis Gate behind Newcastle, the Lake George Gap near Goulburn, and the Kilmore Gate behind Melbourne are specially noteworthy. Along the rocky east coast the land has subsided within recent times geologically and numerous drowned valleys afford excellent harbours, of which Port Jackson (Sydney Harbour) is the most famous. There are numbers of short rivers flowing eastwards into the Pacific Ocean, and some, although their mouths are obstructed by sandbars, are navigable some distance from the sea.

The Central Lowlands lie between the Western Plateau and the landward slopes of the Eastern Highlands, into which they gradually merge. A number of more or less distinct units may be separated:

- (a) The Murray-Darling Basin, which contains the only important river system in Australia. The Murray and its tributary the Murrumbidgee both rise amongst the highest mountains of Australia, which are snow-capped for a considerable period of the year. They are never dry, but the volume of water varies greatly from season to season. The Murray is normally navigable as high as Albury from July to January; on the Murrumbidgee the river traffic is almost negligible. The Darling, though above

its confluence with the Murray nearly twice as long as the main river, and the Lachlan depend entirely on rain falling on the western slopes of the Eastern Highlands. The Darling can be used for navigation only very intermittently. Normally the river flows between well-defined banks 30 to 40 feet high, but in times of flood has been known to form a spread of water as much as 60 miles broad. Before emptying into the sea the Murray enters into a group of shallow lakes—Alexandrina, Albert, and the Coorong—from which the waters reach the sea by a sand-blocked shifting mouth, so shallow as to prevent access by ocean-going craft. As irrigation has increased navigation on the Murray-Darling system has become less and less important as the area is served by rail and road.

The northern part of the Murray-Darling basin lies in the great artesian area of Queensland.

(b) The Lake Eyre Basin. This is an area of inland drainage, the few streams, which are all non-perennial, flowing into Lake Eyre. Lake Eyre itself has a stretch of salt water occupying its southern portion, but the remainder of the lake is usually a vast salty plain. The northern part of the basin also lies in the great artesian area.

(c) The lowlands round the Gulf of Carpentaria, forming the northern part of the artesian basin.

(d) The Rift Valley of South Australia is occupied by Spencer Gulf, Lake Torrens, and several small but important plains. The Rift Valley is separated from the Murray-Darling Basin by the South Australian Highlands.

Geology. The three great physical divisions of Australia are determined essentially by geological structure.

The Western Plateau consists of a massif or stable continental block of ancient rocks—metamorphic schists, gneisses, and slates, with intrusions of igneous rocks, especially of granites, and more basic rocks commonly called greenstones. In the south the rocks are mainly pre-Cambrian, in the north are large areas of old Palæozoic sediments. The rocks over the whole plateau were intensely folded at an early date and were worn down into a plateau. For a very long time now in the earth's history it has formed a "stable block," resisting later folding. The area has not always been at its present elevation above sea-level. The south-east was covered by a gulf of the sea in Tertiary times, and the ancient rocks are there covered by a huge stretch of nearly horizontal limestone forming the Nullarbor Plains.

The Eastern Mountains consist mainly of folded rocks of the Palæozoic periods, pierced by masses of igneous rock, especially granite. Like the ancient rocks of the Western Plateau, these old rocks are, in many places, rich in minerals. The main folding

of the highlands took place before the Coal Measure period, and the coal measures lie mainly in basins amongst the older rocks.

The *Central Lowlands* consist for the most part of younger rocks. The *Murray-Darling Basin* is occupied partly by Tertiary sediments laid down in a former arm of the sea, and partly by later alluvium. The *Lake Eyre Basin* and the lowlands round the Gulf of Carpentaria occupy the site of a great gulf of the sea which existed in Cretaceous times. The sediments laid down in this gulf have since been slightly folded into a broad shallow syncline—the famous “Great Artesian

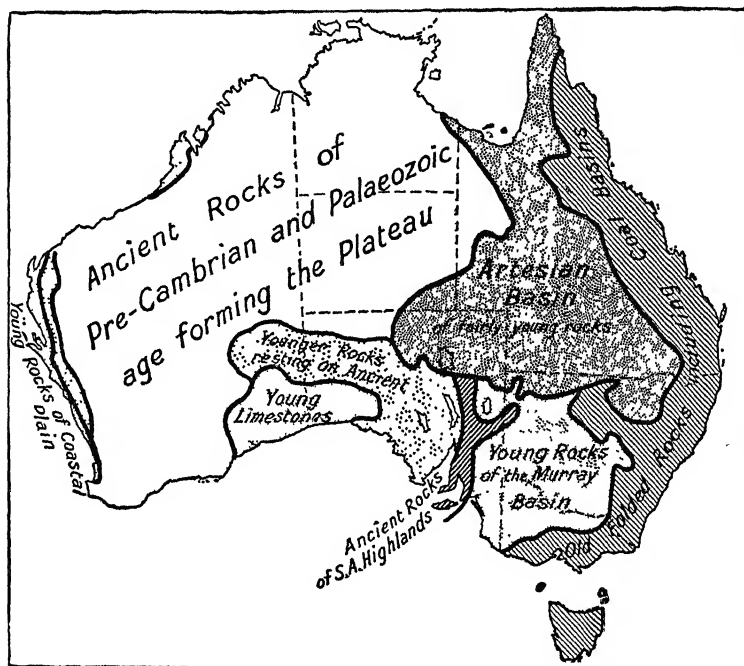


FIG. 141.—Simplified geological map of Australia.

Basin”—the largest of the artesian basins of Australia. The South Australian Highlands consist of ancient rocks which were crushed by earth movements against the ancient massif of the Western Plateau. The highlands consist of a number of plateau blocks with steep escarpments to the rift valley on the west, and more gentle slopes to the Murray Basin on the east.

Minerals. It was the mineral riches of Australia—more particularly gold—which first attracted white colonists to the continent in large numbers, although the spread of the squatters had already settled wide areas. Although the value of the gold produced has fluctuated widely, that of coal showed a steady increase until 1942–43.

Australia is also an important producer of silver, lead, zinc, copper, iron, and tin.

Gold. In the ten years which followed the discovery of gold in 1851, half a million people joined in the gold rushes to Australia. After the initial richness had been exhausted and many of the gold diggers had turned to the development of the land, a new impetus was given to gold mining by the discoveries at Coolgardie in Western Australia in 1891-92. A peak of production was reached in 1903 and there followed a long period of declining output till the devaluation of the Australian currency in terms of gold in 1931-32 led to a revival. Production reached a new peak of £A17½ m. in 1940. Manpower was diverted to other industries during the war.

Then followed a recovery, a decline, and a new recovery after further devaluation in September, 1949. Between 1851 and the end of 1948 gold to the value of £A810,000,000 was obtained in Australia.

Gold is widely distributed in Australia, being absent only from such areas of young sedimentary rocks as the Murray-Darling Basin and the Great Artesian Basin.

It was the richness of alluvial deposits which gave rise to the gold rushes. The "deep alluvial leads" are really alluvial deposits of much earlier geological age buried deeply under newer rocks. The gold-bearing conglomerates of Western Australia may be compared in some ways, with the banket of South Africa.

It must be noticed that many of the famous old mines now yield very little gold. The famous Coolgardie and Kalgoorlie have enjoyed a revival, but in Victoria, Ballarat and Bendigo have very small outputs; the Queensland fields are apparently approaching exhaustion.

Silver and Lead. The annual value of the silver and lead produced in Australia was greater than that of the gold until 1931. It declined during the war years but by 1947 again exceeded that of gold. High overseas prices and a high lead bonus encouraged production but low local prices and high taxation proved deterrents. By far the most important area is Broken Hill in New South Wales. Worked since 1883, it was one of the richest silver-lead areas in the world, and resulted in the rise of a town of 30,000 inhabitants in an arid tract which would otherwise have been almost uninhabited. Nearly all the traffic to and from the mines passed through Port Pirie in South Australia, where huge smelting works were built. The production for many years exceeded 10,000,000 oz. of silver and 200,000 tons of lead and since the Second World War has again topped those figures. After a long career the *original* mines were closed down in 1939. Other silver-lead mines are Captain's Flat in New South Wales; Mount Isa in Queensland; Rosebery in Tasmania.

Zinc. The production of zinc was for long almost confined to the Broken Hill district where it attracted attention as the richer

silver ores seemed to be approaching exhaustion. The plant at Risdon near Hobart in Tasmania has now a large output.

Copper. The production from the widely distributed copper-bearing deposits of Australia varies greatly from year to year according to world prices of copper. South Australia was once the leading state, with the Burra, Wallaroo, and Moonta mines as the chief centres, but labour costs and poorer ore have led to the abandonment of almost all the mines. Queensland is probably the richest state in reserves, especially in the Cloncurry district, and was second to Tasmania in 1948, mainly from the open-cast mine of Mount Morgan. Tasmania's output is mainly from Mount Lyell. In New South Wales there is copper in the silver-lead-zinc ores of Broken Hill, and the famous copper mines of Cobar are again being worked together with Captain's Flat. Copper is electrolytically refined at Mount Lyell and Port Kembla south of Sydney.

Tin. The production of tin from the widely distributed tin ores of Tasmania, New South Wales, and Queensland fluctuates widely, as with copper. Much of the output is from alluvial deposits.

Iron. Iron ores are widely distributed in Australia, but in most cases the richest deposits are far removed from coal, and at present the smelting of the ore and the production of pig iron is almost entirely restricted to the coalfield towns of New South Wales, though a new project at Wundowie in Western Australia now supplies that state. The Lithgow ironworks depend on local supplies of ore, but the larger ironworks at Newcastle and Port Kembla use ore from the immense deposits at Iron Knob, South Australia, and Yampi Sound, on the northern coast of Western Australia. Iron Knob is a hill about 40 miles west-south-west of Port Augusta and is almost a solid mass of good quality iron ore. The quarries are connected by a private railway with the sea-board at Whyalla, 34 miles away. From there the ore is carried by sea to Newcastle and Port Kembla, the limestone necessary as a flux being obtained from Devonport—again near the coast—in Tasmania and elsewhere. There are Government bounties on fencing and rabbit wire, galvanized sheets, and traction engines, and Australian production of iron and steel has increased very rapidly. The Australian product had various difficulties to overcome to compete with the cheap iron and steel of the United States and Europe. Much of the slow progress at first was the result of the high cost of labour, short hours of work, and the great distances separating the deposits of coal and iron, but later great strides were made. Production in 1945–49 averaged half a million tons and now exceeds a million tons.

Coal. The total value of the coal raised to date is only about a quarter of that of the gold, but with the decline of gold-mining, the annual value of coal is about a third of all mineral production.

The most important coalfields lie in basins amongst the older rocks of the Eastern Highlands, especially in New South Wales.

(1) The New South Wales Basin is the largest coalfield in the Southern Hemisphere. In almost the geometrical centre of the basin lies Sydney, but the coal is at present worked mainly at or near the outcrops in:

- (a) The Northern or Newcastle Field.
- (b) The Western or Lithgow Field.
- (c) The Southern or Illawarra Field.

Coking coals occur in the upper series especially round Bulli south of Sydney. The lower or Greta seams are now extensively worked between West Maitland and Cessnock in the northern area,

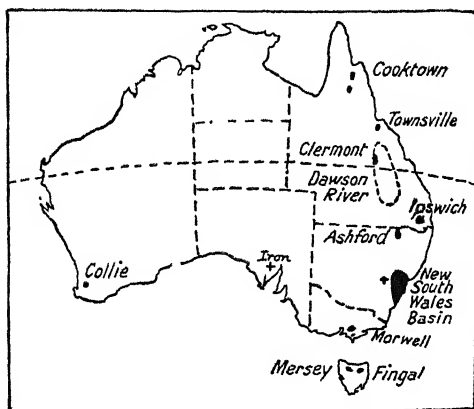


FIG. 142.—The coal fields and principal iron fields of Australia.

which is the premier coal-producing region of Australia. Reserves of good coal in the New South Wales Basin alone are known to be at least 20,000 million tons—equivalent to about 15 years' world supply at the present rate of world production. Probable reserves are five times this quantity.

(2) The Dawson River Basin in Queensland is a huge, practically undeveloped field with excellent coal. Coal is worked farther north at Clermont.

At Callide south-west of the port of Gladstone is a large open-cast mine, and there are others near Rockhampton and in the Ipswich-Bowen-Clermont districts.

(3) Sub-bituminous coal has been mined by the South Australian Government at Leigh Creek since 1942.

(4) Small fields with excellent coal occur at Ashford in New South Wales; in the Mersey River area in Tasmania; near

Townsville and near Cooktown (two) in Queensland. The small Collie coalfield of Western Australia has a poorer quality. All the above coalfields are of Permo-Carboniferous age. In addition Australia has a number of fields with coal of a later age. The Triassic and Jurassic coals may be almost as good as the older Permo-Carboniferous coals, but the Tertiary basins yield only brown coals or lignites.

(1) The Ipswich Field, in Southern Queensland, furnishes coal which is excellent for the manufacture of coke. The field is a large one and extends into New South Wales (Clarence and Richmond River Fields), but the coal there is good enough for local use only.

(2) The Fingal Field, Tasmania, furnishes coal similar to that of Ipswich.

(3) The brown coal reserves of Victoria are estimated to exceed 10,000 million tons. The Morwell deposits have been opened up by an open mine at Yallourn and electricity is being generated to supply Melbourne and a large area. A plant also produces briquettes.

Other Minerals. For many years much attention has been given to the search for mineral oil in Australia. There have been many disappointments, and prospects are not very encouraging. Extensive deposits of oil shale are known in Tasmania and New South Wales, and may later become of commercial importance. Large quantities of salt are obtained from shallow lakes in South Australia, chiefly in Yorke Peninsula, and from lakes in Northern Victoria as well as by the evaporation of sea-water in South Australia, Victoria and Western Australia. The Scheelite mine on King Island, Tasmania, comprises one of the largest known deposits of tungsten in the world. An intensive search for uranium and radioactive minerals began in 1948 and big deposits were opened up at Rum Jungle (N.T.) and Mary Kathleen (Queensland). Among gemstones, the Lightning Ridge Field of New South Wales, the Opalton area of Queensland, and the Stuart's Range Field of South Australia are all famous for their fine opals. Sapphires (from Anakie, Queensland), a few diamonds, arsenic, antimony, cobalt, gypsum, molybdenite, osmiridium, and platinum are also obtained. Bauxite in huge quantity exists on the west of York Peninsula.

Climates. The climatic conditions of Australia are controlled by certain dominant factors:

(1) *Latitude.* The Tropic of Capricorn passes right through the continent; the latitude of 40° S. lies between Australia and Tasmania. In December, in the southern summer, the sun is thus shining vertically over Australia, and the whole continent (excepting Tasmania) lies in the Trade Wind Belt, and the prevailing winds are from the east (South-East-Trades). Owing

to the great heat over the heart of the continent a monsoonal effect is developed over the north-west. In the southern winter, Northern and Eastern Australia lie still in the Trade Wind Belt, but the southern coasts come under the influence of the Westerlies.

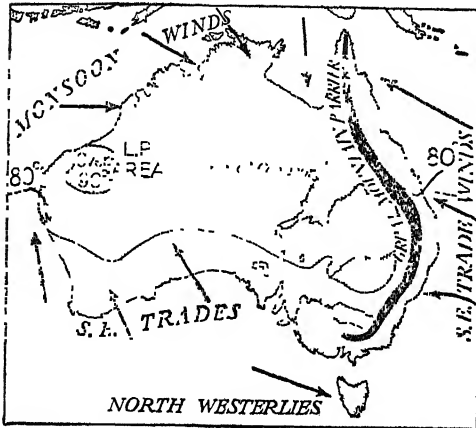
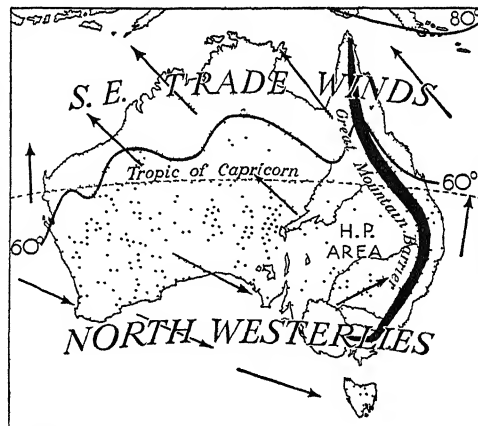


FIG. 143.—Climatic conditions in the hot season (November to April).

Notice the low pressure centre (L.P.) in the north caused by the great heat, and notice the monsoon winds which it causes. The isotherms are those for January -

FIG. 144.—Climatic conditions in the cold season (May to October).

Notice how the main wind systems have moved northward and that the southern coast comes under the influence of the Westerlies (formerly called North-West Anti-Trades). The isotherms are those for July.



(2) *Configuration.* At all seasons the Eastern Highlands form an effective barrier to the penetration of the Trade Winds, and the fact that the western half of Australia is an elevated plateau prevents the effective penetration of the monsoons along the north-west coast in summer and the Westerlies along the south in winter. It follows that only the margins of the continent have an adequate rainfall; the interior is everywhere arid.

Figs. 143 and 144 illustrate temperature and wind conditions in January (summer) and July (winter). Fig. 145 is a simplified rainfall map of Australia. Certain of the same rainfall lines are

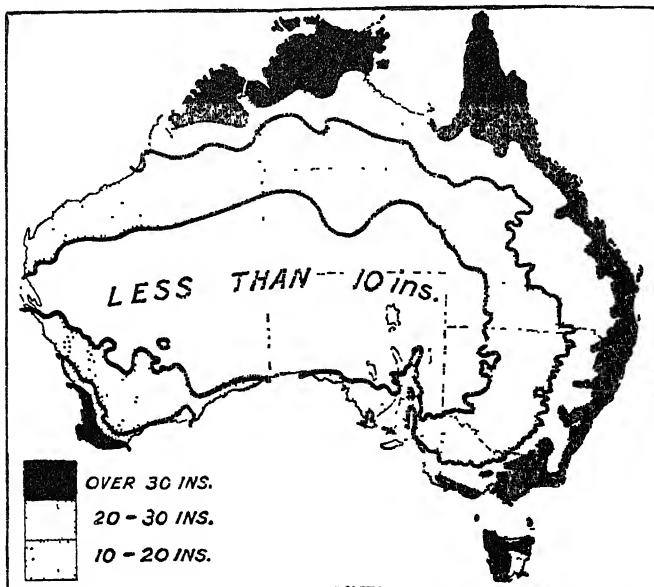


FIG. 145.—A simplified rainfall map of Australia.

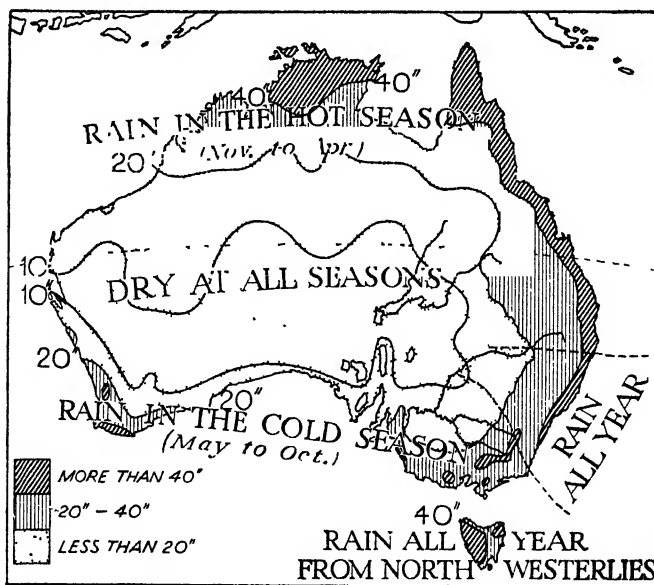


FIG. 146.—The seasonal distribution of rain in Australia.

In the Tropics 20 inches of rainfall may be regarded as roughly a minimum for agricultural development, in the Temperate regions 10 inches is sufficient.

repeated on Fig. 146, which also indicates the seasonal distribution of rainfall. In the dry heart of Australia the rainfall is not only very meagre but also very unreliable. This is illustrated in Fig. 147.

During the winter the greater part of Australia, south of the Tropics, is subject to ground frosts. A frost map (Fig. 148) has been included because of the importance of frost in agriculture, but Australia does not suffer in the same degree as South Africa from harmful late spring frosts (October and November) or equally harmful early autumn ones (March and April).

Climatic Regions. Fig. 147 shows a division of Australia into climatic regions.

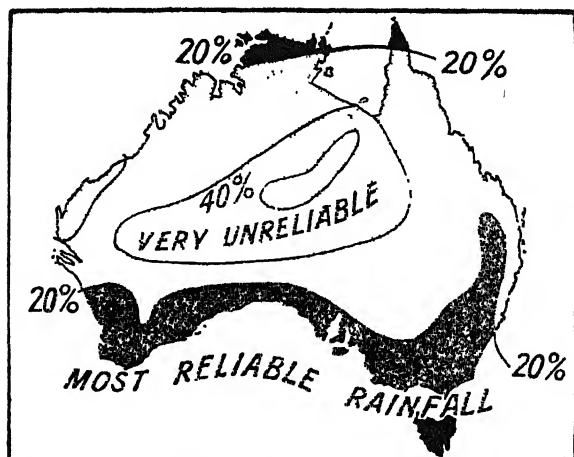


FIG. 147.—Rainfall reliability (after Prof. Griffith Taylor).
The percentage figures refer to the annual departure from the average.

The Tropical Climate (Sudan Type, or climate of the Tropical Grasslands or Savanas) is found over a broad belt across the north of Australia. It is a summer rainfall climate and, as we have seen, much of the rainfall in the north-west is due to a monsoon, so that in the north-west the climate may be described as monsoonal, like that of India. The wettest regions are along the north coast (monsoonal) and the north-east coast of Queensland (where the rainfall is partly monsoonal, partly brought by the Trade Winds). In the latter region only is there sufficient rain to support the growth of forests. Farther inland is the typical savanaland.

The Hot Desert Climate is found over a large area in the heart of Australia, over 1,000,000 square miles receiving less than 10 inches of rain in a year. Notice that Australia lies in exactly the same latitudes as the great deserts of the world, such as the Sahara, Arabia, Atacama, and Kalahari.



FIG. 148.—Frost map of Australia.

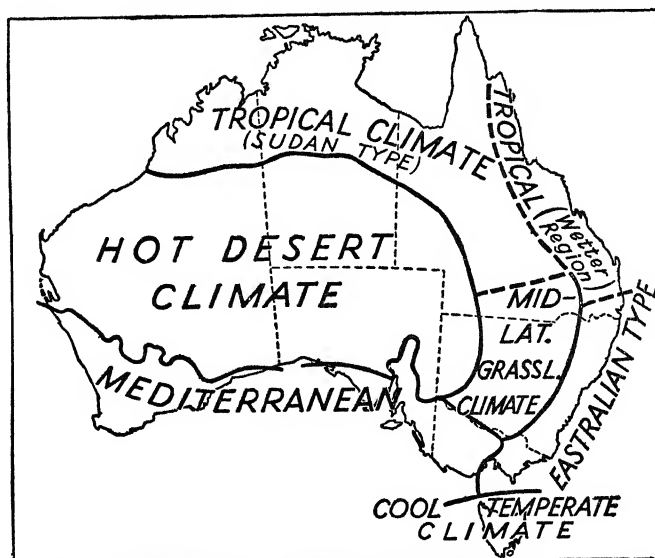


FIG. 149.—The climatic regions of Australia.

The Warm Temperate Oceanic Climate is found along part of the east coast—roughly the eastern part of New South Wales. This type of climate has been called the Eastralian type. The land mass of Australia is small when compared with that of Asia, and

eastern Australia does not suffer from the icy winds which blow across China from the interior in the winter months. Although even in Australia, as winter visitors to Katoomba know very well, bitterly cold winds from the west do sweep across the flat tops of the Blue Mountains, the Eastralian winter is comparatively mild. Sydney has a far more equable climate than Shanghai, which is roughly in the same latitude in the Northern Hemisphere. Snow, which is usual in Shanghai in the winter months, does not fall on the coastal lowlands of New South Wales. Thus the "China Type" of climate with its summer monsoon rainfall and its bitterly cold winters does not occur in the Southern Hemisphere. Its place is taken by the Eastralian type with a well-distributed rainfall brought by the Trade Winds and comparatively mild winters.

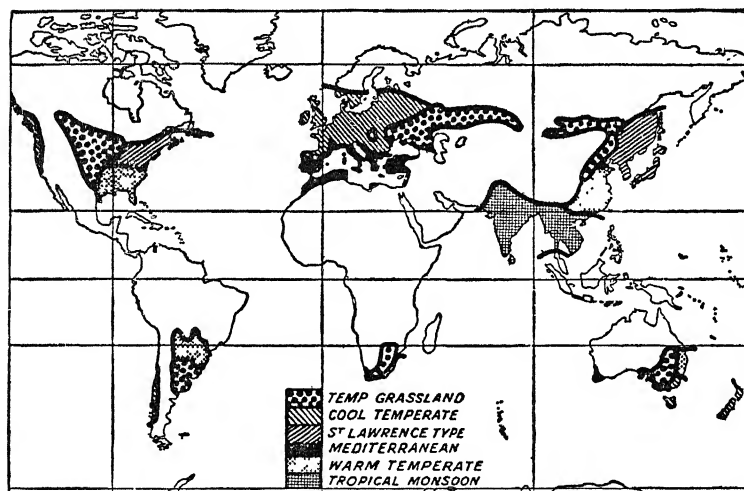


FIG. 150.—The more favourable climate regions—Monsoon climate, Warm Temperate Oceanic (China and Gulf types), Mediterranean Climate, Cool Temperate Oceanic, St. Lawrence type, and Mid-Latitude Continental Climate.

The Mediterranean Climate occurs in roughly the same latitudes as the last type, but on the western sides of the continents. So in Australia it is found in the south-west of Western Australia, part of Southern Australia and the western part of Victoria. The eastern part of Victoria really receives too much rain in the summer months to be considered a typical Mediterranean climatic area; it may be considered intermediate in character between the Mediterranean, the Warm Temperate and the Cool Temperate.

The Mid-Latitude Continental or Grassland Climate occurs in the same latitudes as the Mediterranean and Temperate Oceanic Climate, but towards the interior of the continent. Owing to the

small size of the land mass no part of Australia is far removed from the influence of the sea, and so no part experiences the extremes found in the heart of North America or of Eurasia. Winnipeg (Canada) has a range of temperature between summer and winter of over 60° F.; at Bourke, in the grassland region of Australia which agrees roughly with the lower part of the Murray-Darling Basin, the range does not generally exceed 33° F. The well-known Riverina of Australia lies in this climatic region, and so the climate is sometimes known as the Riverina type.

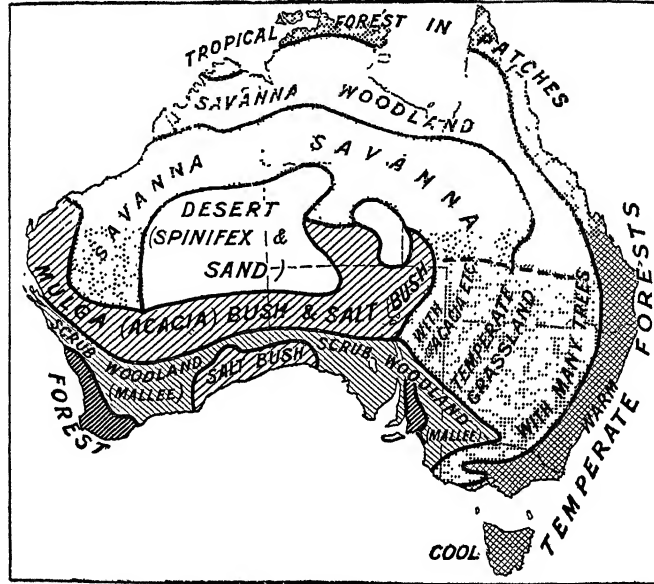


FIG. 151.—The natural vegetation of Australia.

Recent work shows that the patches of tropical forest are found only in north-eastern Queensland.

The Cool Temperate Climate, which is similar to that of the British Isles and North-Western Europe generally, occurs in Tasmania and New Zealand. A somewhat warmer type occurs in eastern Victoria. Tasmania lies in the path of the westerly winds, and so the west of the island is wetter than the east. We find that the same is true of New Zealand and the British Isles.

Natural Vegetation. The natural vegetation or "bush" of Australia does not exhibit the variations which one might expect from the great differences in climate. There is not, for example, the contrast one would look for between the forests of Queensland, Victoria, and Western Australia. This is owing to the fact that Australia was cut off from Asia at an early date, and has a fauna and

flora highly peculiar to itself. The most characteristic trees are the various eucalypts or gum-trees. Most of them have a somewhat sparse, grey-green foliage, evergreen but with the edges of the leaves turned towards the sky. Other characteristic plants are the acacias, and the salt-bush and blue-bush of arid tracts. Bearing in mind the sameness in the scenery due to the wide distribution of the eucalypts, each type of climate has its characteristic vegetation.

With a *Tropical Climate* the patches of tropical forest in the wettest parts give place to savana-woodland and then to typical savana. With a *Mediterranean Climate* the forest of the wettest parts gives place to a scrub woodland in which mallee (a small eucalypt) is the principal bush, and then to a scrub of mulga (an acacia) and salt-bush. The typical vegetation of the *Eastralian Climate* is a eucalypt forest; inland this passes gradually through a grassy forest to savana-like grasslands and then into the temperate grasslands of the Murray-Darling basin, with a *Temperate Grassland Climate*. The Cool Temperate Forests of Tasmania are in part eucalypt forests like those of the mainland, but large tracts of beech forest also exist and render a closer comparison with Europe possible.

Forests and Forestry. Australia as a whole cannot be described as a continent rich in natural forests. Forests of good timber trees occupy less than one-sixtieth part of the Commonwealth—the official estimate being 1·02 per cent. The natural forests occur in five main areas:

(1) Blue Gum and other Eucalypt Forests occupy the crests and coastal slopes of the mountains of New South Wales and Victoria, including the Gippsland and Otway Hills.

(2) Tropical Forests occur irregularly down the east coast of Queensland and in the extreme north of Northern Australia. Unlike most of the forests of Australia some of the trees yield soft timber.

(3) Stringybark and Blue Gum Forests occur on the ranges of the South Australian Highlands.

(4) Fine karri forests (about 1,000,000 acres) as well as jarrah forests (about 8,000,000 acres) occur in the south-west of Western Australia.

(5) Important forests cover a large area in Tasmania.

Besides timber, the Australian forests yield large quantities of firewood, eucalyptus oil (obtained from the leaves), and barks used in tanning. Good tan bark is yielded by the golden and black wattles, but the greatest quantity is now obtained from plantations of Australian wattles in South Africa. Australia exports hard timber—which has a good reputation in South Africa, Great Britain, New Zealand, etc., for railway-sleepers, wood-paving, and furniture—but in decreasing quantity, and imports soft timbers for building of

twice the value of exports. The bulk of the softwood timber is now imported from the United States, Canada, New Zealand, and Scandinavia; but both in Australia and New Zealand large areas are being planted with *Pinus radiata* and other softwood trees.

The danger of introducing wild or semi-wild plants into a country where they are free from hereditary enemies has been seen in Australia in the case of the Prickly Pear, which rendered useless thousands of acres in Queensland and New South Wales until

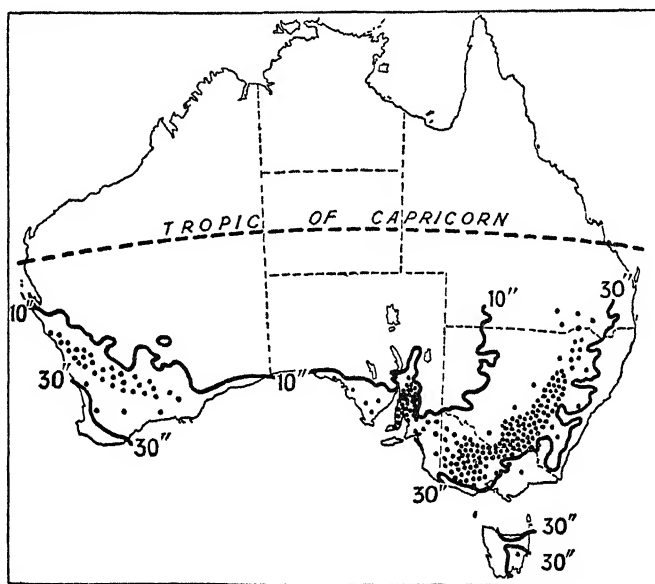


FIG. 152.—The distribution of wheat in Australia.

Each dot represents a yield of 500,000 bushels on an average in the years 1930-1949. Notice that all the wheat is grown south of the Tropic of Capricorn, and nearly all where the rainfall is between 10 and 30 inches—it is grown especially between 20 and 30 inches.

eradicated by the cochineal insect, specially introduced to combat it. In the animal kingdom the same thing is seen in the case of rabbits, introduced by early settlers, which have multiplied at an enormous rate. They eat every vestige of green stuff from large tracts of land and so render vast areas unfit for sheep, and huge sums of money have been spent, often largely in vain, on rabbit-proof fences to prevent their spread. Then nature stepped in and four-fifths died as a result of a virulent disease.

Agriculture. Primary production from agriculture, pasturing, dairying, mining, and forestry is the mainstay of Australian prosperity.

Wheat. Wheat is by far the most important crop in Australia.

It occupies an area of over 12 million acres (1946–51 average) or about half of the total land under crops on the continent. Even then, this area is less than 0.6 per cent. of the area of the continent. The Wheat Belt of Australia lies entirely outside the Tropics and almost entirely between the isohyets of 10 inches and 30 inches (Fig. 27). It will be noticed that the Wheat Belt lies mainly in the areas of Mediterranean and Temperate Grassland Climate. Farming practice differs considerably from that of other lands. In the spring-time—July and August—the ploughing for the next year's crop takes place. The ploughing is deeper in the lighter soils, but may be only 3 or 4 inches in heavy clays. The surface is then harrowed and raked over with a scarifier or cultivator. The fine surface layer so formed prevents loss of water from the lower layers of the soil, and renewed harrowing after each shower prevents the

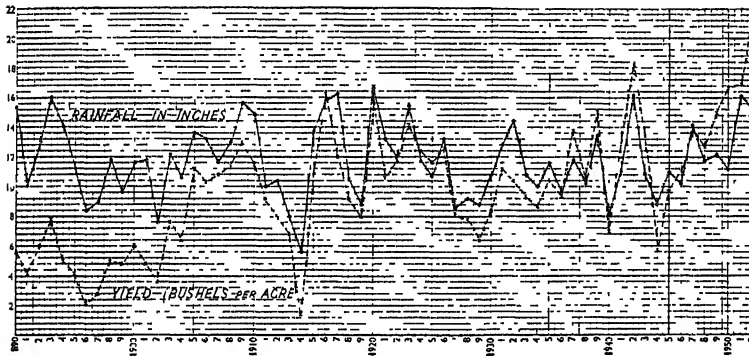


FIG. 153.—Graph showing the close connection between winter rainfall (April to November) and yield of wheat. This graph also illustrates the steadily improving yield.

The graph is based on the figures for the wheat-growing lands of South Australia.
(After A. G. Price)

hardening of the surface. The preservation of this powdery surface layer is the basis of the Australian "Dry Farming" system. Sheep are often turned out on the fallow to keep it clear of weeds and to enrich the soil by their manure—hence mixed sheep and wheat farming. The seeds are sown by drill in the autumn—about April, after the first autumn rains—the sowing being preceded by harrowing. Rains may be expected during June, July, and August, but the critical period when rain is essential is October and early November. Fig. 153 shows the close connection between winter rainfall and total yield. The earliest varieties of wheat are ready for harvesting in December. Owing to the dryness and firmness of the wheat stalk, combined with shortage of labour, Australia evolved

as early as 1843 the machine known as the stripper. This machine America and Australia improved into the harvester, which not only cuts the wheat but threshes it and puts the grain into bags. The area under wheat in Australia grew steadily up to 1915-16, when a special war-time effort led to the cultivation of 12½ million acres and a production of 179 million bushels. Bad seasons and post-war conditions resulted in a serious decline, so that in 1919-20 the acreage fell to less than 6½ million acres, producing only 49 million bushels. Until 1940 there was a fairly steady increase in acreage but prices were low. There was a severe drought and a crop failure in 1944 but it is generally believed that acreage is best kept about 12,000,000. New South Wales (25-32 per cent.) leads in acreage and total yield; Victoria is a good second, and Western and South Australia

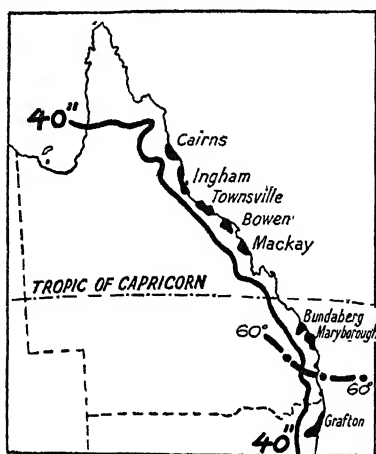


FIG. 154.—The distribution of sugar-cane in Australia.

Notice that all the sugar-cane is grown where the rainfall is more than 40 inches per year, and nearly all where the temperature is above 60° for the three winter months.

are close rivals for third place. In the existing Wheat Belts there is ample room for extension of cultivation. Even in the best years only about a fifth or a sixth of the available land is in use. There is still ample room for improvement in the common yield of 12 to 18 bushels per acre (Canada, 20). Despite her huge production Australia only grows 3 to 4 per cent. of the world's total. But much of Australia's crop is normally available for export. Australian wheat has a high reputation for its whiteness, and often commands the highest prices in the world's markets.

Nearly half the export goes to the United Kingdom, much of the remainder to India, New Zealand, Egypt, and Japan.

Oats. Oats come next in order of importance amongst the cereal crops of Australia, but cover only a little more than one-fifth of the area devoted to wheat. As usual, they grow in damper and cooler regions than those favouring wheat. Apart from a small proportion (10-15 per cent.) consumed in making oatmeal, oats are used as fodder.

Barley. Despite wide fluctuations, the area devoted to barley has shown a marked tendency to increase steadily in recent years. The bulk is malting barley for the local brewing industry. The surplus goes mainly to Belgium, India, and Great Britain.

Maize. Maize is grown for grain in Queensland and New South Wales, but mainly for fodder in the other states. Formerly, with climatic regions eminently suitable, Australia did not grow enough of this cereal to satisfy her own requirements, and imported additional quantities from South Africa. By 1940 and since, however, imports had become negligible.

Hay. Next to wheat and oats, hay covers the largest area of any crop—nearly a ninth of all the cultivated land. A large proportion consists not of the meadow grasses of other lands, but of wheat,

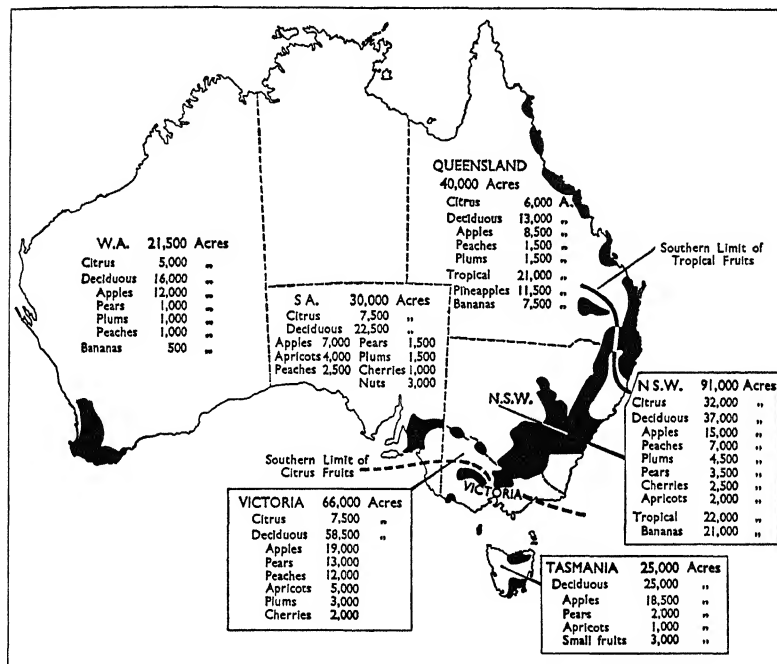


FIG. 155.—The distribution of fruit in Australia, 1953–54.

The majority of fruit orchards are within the areas marked in black, but are irregularly distributed.

oats, and lucerne. The dairying industry depends largely on hay and green fodder, and much lucerne is grown for sheep.

Sorghum. Sorghum for hay and green fodder and latterly for grain has been developed in recent years in the eastern states, especially in tropical Queensland.

Potatoes grow well in the cooler climates of Tasmania, Victoria, and New South Wales.

Sugar. The sugar-cane flourishes in the warm coastal strip of Queensland (see Fig. 154). Despite the difficulties of cultivation by white labour under the White Australia Policy, Australia produces

now a varying surplus for export—with a record of £A21,000,000 worth in 1952–53.

Fruits. The fruit-growing industry of the Commonwealth is now a very important one, and is increasing rapidly. Fig. 155 shows that all four principal classes of fruit are grown. Owing to the fact that the seasons are reversed when compared with Europe, Australia shares with South Africa the advantage of being able to supply fruit to the European markets when it is scarce in the Northern Hemisphere. For deciduous fruits Victoria and Tasmania are pre-eminently the fruit-growing states. The export from Australia of fresh apples alone is again valued (1952) at well over £4,000,000 sterling or £A5,000,000 after the virtual cessation during the Second World War. Dried nectarines and peaches are also particularly important. Vineyards (137,000 acres in 1952–53) are specially important on the sunny slopes of the South Australian Highlands (60,000 acres) and on the irrigated lands of the Murray Basin. Wine-making, drying of raisins and currants are all noteworthy, and Australian products are making a bid for the European markets, especially in Great Britain. The principal Australian fruits figuring as exports are apples and pears, oranges, raisins, dried peaches, and apricots.

Minor Crops. These include vegetables, formerly grown by the now disappearing Chinese. During the Second World War canning and dehydrating plants were set up to meet the demand of the Services. Other minor crops are tobacco, flax, hops (in Tasmania and Victoria), peanuts and cotton, the two latter in Queensland.

Live Stock.—Sheep. Of all the animal fibres used in the textile industries the most important is the wool of the domestic sheep.

For the production of wool, sheep require a cool, dry climate without extreme cold. The Temperate Grasslands of the Southern Hemisphere are thus eminently suitable; those of the Northern Hemisphere suffer from too great a cold in winter to form ideal sheep country. Thus at Dubbo, in the Australian sheep-rearing regions, the temperature ranges from 47° F. in July to 79° in January; at Graaf Reinet in South Africa from 51° in July to 72° in January. Wool-sheep thrive on comparatively poor herbage. With a rainfall of less than 10 inches, growth of grass or other fodder tends to become inadequate; with a rainfall of much over 30 or perhaps 40 inches the grass tends to become too luscious and the sheep suffer from foot rot and other diseases. Although dry conditions favour production of wool, the stock tends to become impoverished and may need to be replenished by strong, healthy animals from cooler, damper regions. Thus Australian sheep runs are replenished to a considerable extent from Tasmanian flocks.

The breeding of sheep for the sake of their wool is the most important of all the agricultural and pastoral industries of the

Commonwealth, as well as one of the oldest. Except perhaps for the U.S.S.R., Australia has the largest flock in the world (123,000,000 in 1952), producing a quarter of the world's wool. The influence of climate is well shown in Fig. 156. Although attention is now being paid to the rearing of good mutton-sheep much of the Australian pasturage is suited only to wool-sheep. Sheep bred for mutton require a damper climate and better pasture than do those bred for wool. Mutton-sheep are heavy, well-fed animals, thriving in



FIG. 156.—Sheep lands of Australia, showing “climatic control.”

Nearly all the sheep are found between the isohyets of 10° and 30° and nearly all in the temperate zone. Each dot represents 250,000 sheep.

The very large number of 106,421,000 sheep was reached in 1891, when, however, many of the runs were overstocked. The number of sheep and the production of wool in Australia fluctuate in a marked way with the rainfall. Enormous numbers of sheep perished in the great droughts of 1901–2, so that the number of sheep dropped to 54,000,000 in 1902. Over 100,000,000 may be regarded as normal.

such cool temperate climates as those of Britain and New Zealand. In the drier parts the sheep are allowed to wander over large areas in search of food. Before its destruction by the disease myxomatosis, rabbit competition was serious. Over large areas of the drier parts salt-bush and blue-bush afford good food, but do not quickly recover when closely cropped by sheep. Under existing conditions it is doubtful where the number of sheep in Australia could be profitably increased; improvement in the weight of the average fleece is the obvious line of progress. Australian wool is mainly from the merino sheep, and the average inter-war production was 1,000 million lb. (1,176 million lb. in 1952–53). Most of the wool is sold before

export, the leading marts being Sydney, Melbourne, Geelong, Brisbane, Adelaide, Perth, Hobart, and Launceston. It is exported mainly in the grease. Of recent years Australia has begun seriously to turn her attention to the home manufacture of woollen goods, and there are mills at Geelong, Sydney, and elsewhere, the annual output of which exceeds £A50,000,000 in value.

Live Stock.—Cattle. Although the rearing of cattle is not nearly such an important industry as that of sheep, there are about

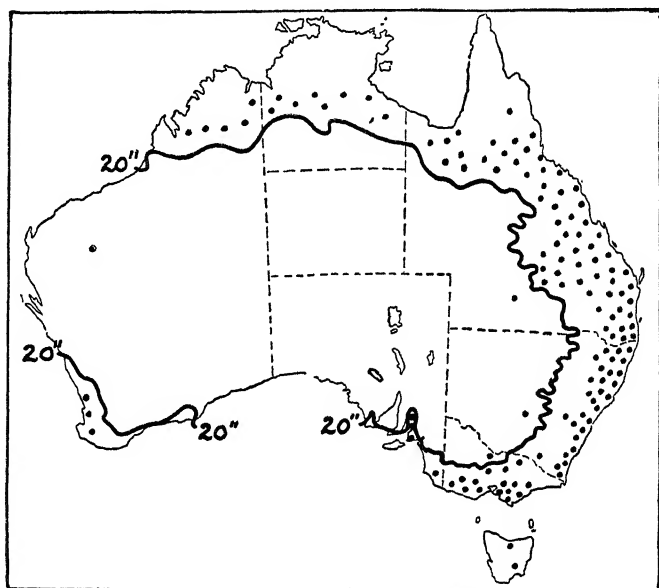


FIG. 157.—The distribution of cattle in Australia.

Each dot represents 100,000 cattle. Notice that they are nearly all found where the rainfall is more than 20 inches per year.

15,000,000 cattle in Australia. Beef cattle flourish on the ranching country of the savanas of Northern Queensland, Northern Australia, and Western Australia. Dairy cattle are kept in the wetter parts of the temperate regions, especially on the coastal sides of the Eastern Highlands in Victoria and New South Wales. The local consumption of beef is very large, and about 75 per cent. of the beef produced is eaten in Australia. Of recent years there has been a fluctuating export of beef, canned meat, butter, preserved milk, and cheese.

Other Live Stock.—Horses. Horses are still important in agricultural operations but have declined rapidly with mechanization. Australian horses, including racehorses, have a high reputation.

Pigs. Under normal conditions there are over a million pigs in the Commonwealth, mainly in Victoria, New South Wales, and

Queensland. The production and export of bacon and ham and lard reached high figures during both World Wars.

Poultry-keeping expanded during the Second World War with the development of dried egg powder after 1942. *Bee-keeping* has given rise to an export of honey, notably to Britain.

Artesian Water and Irrigation. In a country such as Australia where the rainfall over a large area is very low and where even the scanty rainfall is irregularly distributed from year to year, irrigation and conservation of water are matters of great importance. Australia is fortunate in possessing a number of artesian basins, which

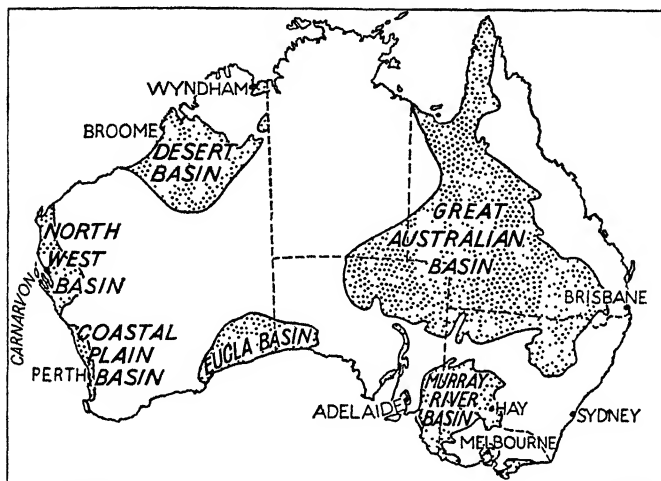


FIG. 158.—The artesian basins of Australia.

(From Report of the Fourth Inter-State Conference on Artesian Water.)

are shown in Fig. 158. The artesian basins mark the sites of old gulfs of the sea which have been filled up with porous sandstones overlain by impervious blue clays and other rocks. The water is imprisoned in the porous sandstones until the covering layer of clay is pierced. Whilst some geologists believe that the water originated deep down in the earth's crust and when used up will not be renewed, the majority hold that it is replenished by rain falling on the edges of the basins. The more important artesian basins of Australia are:

(1) *The Great Australian Basin* covers more than half a million square miles, including half of Queensland. In Queensland alone there are more than 5,000 bores, in New South Wales over 700, and in South Australia 200. The yield of water from flowing bores alone is about 350 million gallons per day. The water is excellent for watering stock, and is of paramount importance in the Queensland cattle industry. The deepest bores are over

7,000 feet in depth and the water issues at a high temperature. It contains a considerable proportion of mineral salts, especially sodium carbonate, which would, in course of time, accumulate in the soil if the water were used for irrigation, for which it is not, therefore, suitable.

(2) *The Murray Basin* has not yet been greatly developed because water for irrigation is available from the Murray River.

(3) *The Eucla Basin* occurs in a part of Australia which is particularly dry and where water for irrigation is greatly needed. Unfortunately, in most parts of the basin the water is too heavily charged with salts to be suitable either for watering stock or for agriculture, and little has yet been done to develop the basin.

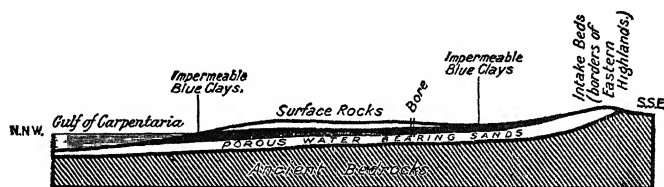


FIG. 159.—Section across the great artesian basin of Australia.

Notice the difference from the simple basin type.

(4) *The Coastal Plain Basin* supplies water to Perth, and a somewhat similar basin exists on the Adelaide Plains, whilst the *North-West* and *Desert Basins* in Western Australia have been as yet little utilized except to supply water at intervals to such centres as Broome and Derby along routes leading to them.

River Irrigation Works are important in the Murray Basin—the Nile of Australia. The use of the water has been regulated since 1914 according to the Murray Waters Agreement, and since 1917 irrigation and navigation schemes have been controlled by the River Murray Commission, the cost being shared equally by the Commonwealth Government and the Government of each of the three states concerned. There are at present several great projects in hand:

(a) The Snowy River Power scheme by which the waters of this eastward river will be taken through a tunnel under the Australian Alps near Mount Kosciusko to augment the supply of the Murray and Murrumbidgee for irrigation (begun 1949).

(b) The Kiewa project of Victoria to use water from the Bogong High Plains to generate power for Melbourne and then to provide additional irrigation water.

(c) The extension of the Hume Reservoir, near the junction of the Mitta Mitta and the Murray.

(d) The enlargement of Eildon Reservoir.

Existing works include:

(a) The Murrumbidgee Irrigation area, supplied by the Burrinjuck (Barrenjack) Dam, 200 miles away—now a leading fruit and dairying district.

(b) The series of weirs and locks on the Murray and on the Murrumbidgee.

(c) The Curlwaa Irrigation area, supplied by water pumped from the Murray.

(d) The Goulburn Irrigation area, supplied from Goulburn Weir.

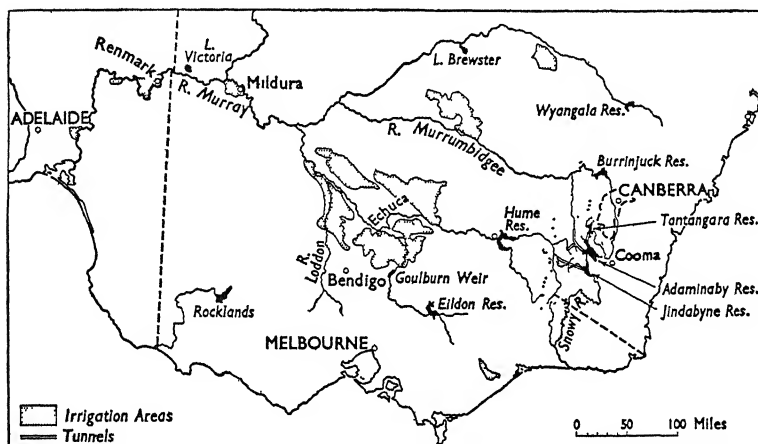


FIG. 160.—The irrigation works on the Murray and Murrumbidgee in New South Wales and Victoria.

(e) The Murray River Irrigation schemes, supplied by water from a weir 20 miles below Echuca.

(f) The Loddon River scheme, utilizing to a small extent the waters of the Loddon.

(g) Mildura, a small but intensely cultivated area supplied by water pumped from the Murray.

(h) The Lake Victoria Storage, to supply South Australia.

(i) Renmark and other irrigation areas in South Australia—important fruit-growing areas.

(j) Parts of Swanland, Western Australia, supplied from the Canning and Stirling Dams.

There are large numbers of smaller irrigated areas as well as water schemes under which the water is used for stock and domestic purposes only. There are many other large schemes proposed.

Population. The first European (British) settlement at Sydney dates only from 1788, and for long the separate colonies were very isolated from one another. Their union as the Commonwealth of Australia came into being in 1901.

In 1850, before the discovery of gold, the population numbered a little over 400,000. By 1860 it had risen to 1,145,585. The census of 1921 showed 5,435,734; that of June, 1954, showed 8,987,000. The total of 10,000,000 was passed during 1959—excluding about

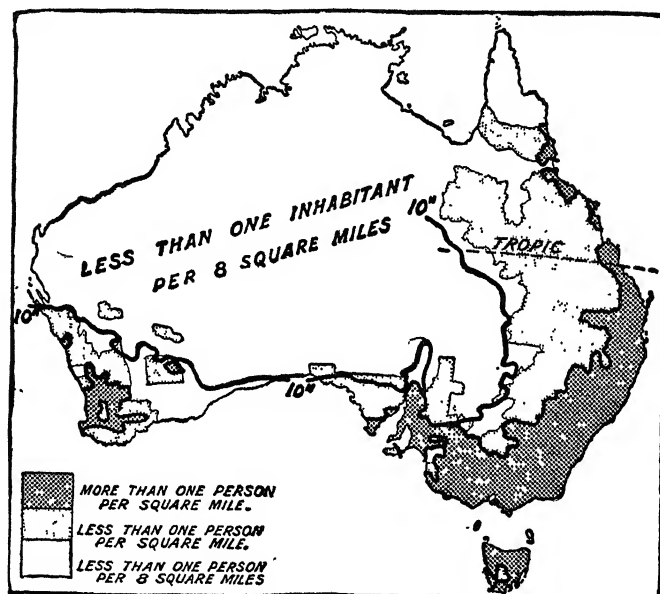


FIG. 161.—The distribution of population in Australia.

(Adapted from the *Commonwealth Year Book*.)

50,000 aborigines. Owing to a low death rate natural increase is fairly rapid—8 per annum per 1,000. Australia is still very thinly populated, with an average density of just over 2·5 per square mile. This may be compared with the United States, about the same area, with 45. Although the Commonwealth depends for its prosperity on its agricultural and pastoral industries only one person out of every three lives in the country. Over half the total population is concentrated in the six capital cities. Taking Australia as a whole, 95 per cent. of the population lives in the temperate regions, south of the Tropics. The greater part of Tropical Australia is virtually uninhabited. With the exception of the mining centres of Kalgoorlie and Broken Hill, the “dry heart” of Australia with less than 10 inches of rain (see Fig. 161), is also almost uninhabited. Although it is

probable that more than a third of the continent—the arid interior—will never be appreciably developed (unless by mining), there is room for a big expansion in the temperate regions already populated and the tropical regions with a good rainfall at present almost uninhabited.

Over 99 per cent. of the Australian population is of European descent. There are 47,000 aborigines, 34,000 half-castes of various kinds, and 9,000 Chinese (1947). Under what is known as the "White Australia Policy," the immigration of Asiatics and other

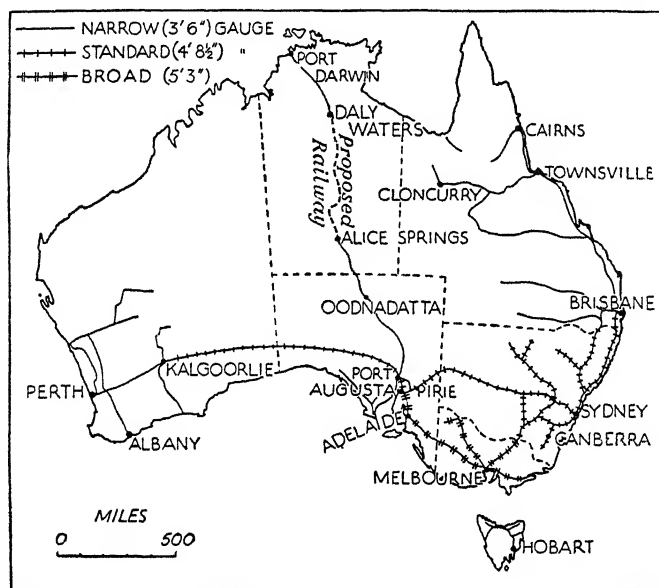


FIG. 162.—Railways of Australia, showing the various gauges.

non-European races has long been stringently restricted. Two important problems face the Commonwealth:

(a) Whether the tropical regions can ever be effectively developed without the help of coloured labour.

(b) Whether Australia will be reasonably able to prevent the influx of Asiatics when the extent of her undeveloped but desirable tropical regions becomes generally known in Asia.

In the meantime, the Commonwealth is encouraging the immigration of Europeans and is making considerable progress in the development of tropical Queensland by European labour.

Communications.—Railways. The Australian railway system grew up gradually round a number of independent points—the state capitals—each centre formulating its own policy independently of the others. Hence the mixture of gauges which is the great draw-

back of the Australian railways at the present time. The *Queensland Railways* are on the narrow or 3 feet 6 inches gauge; until recently there were four groups of lines connecting the ports of Cairns, Townsville, Rockhampton, and Brisbane with their respective hinterlands. These have now been linked together by a coastal line. Two other short lengths from Cooktown and Normanton are still isolated. The *New South Wales Railways* are on the standard gauge (4 feet 8½ inches) and radiate in all directions from Sydney. The difficulty of crossing the Blue Mountains was not surmounted till 1875, and the bridging of the Hawkesbury River between Sydney and Newcastle was not completed till 1889. A coastal line between Sydney and Brisbane was completed only in the inter-War years; there is not yet a coastal line to Melbourne. Two of the three chief lines inland from Sydney make use of well-known natural gaps—the Cassilis Gate and the Goulburn Gap. The *Victorian Railways* are on the broad (5 feet 3 inches) gauge and radiate from Melbourne. The broad-gauge line extends to Adelaide. The *South Australian Railways* use all three gauges (see Fig. 162). The *Trans-Continental Railway*, completed in 1917, connects Port Augusta in South Australia with Kalgoorlie in Western Australia. It is on the standard (4 feet 8½ inches) gauge. It is owned and operated by the Commonwealth, and so is the north-south line from Darwin to Birdum and Adelaide to Alice Springs with the connecting highway. The *Western Australian Railways* radiate from Perth and serve particularly the agricultural regions, especially the Wheat Belt. The *Tasmanian Railways*, on the narrow gauge, afford interesting examples of the way in which railways in mountain country are forced to follow river valleys. An eventual conversion of all lines to standard gauge is planned.

Roads. It cannot be said that Australia is, as yet, well supplied with good roads. The Prince's Highway, following the coast, affords an alternative route to the railway from Sydney to Melbourne and Adelaide, but elsewhere the roads supplement and feed rather than replace the railways. Fortunately, much of Australia is comparatively level and free from permanent watercourses, so that in the dry season the ubiquitous motor-car can be used, almost without need of definite roads, to communicate with outlying stations.

Air Transport. Australia has been almost a pioneer in the use of air transport. Regular services link the chief towns, including Hobart, as well as Australia via Darwin and Singapore with Europe, and Australia via Fiji and Honolulu with Canada. Many business men and doctors regularly use their own planes. The "Flying Doctor" service is world famous.

The Foreign Trade of Australia. Owing to the large and increasing urban population of Australia, a number of products do not figure

amongst the exports but are consumed at home. This is true of most manufactured goods.

Exports. Fig. 163 shows the principal exports and their relative values in the inter-war years. Australia is the largest exporter of wool in the world and ranks third in wheat and wheat flour. Notice that all the leading exports are raw materials, as Australia is still in the primary producing stage, although manufactures are developing.

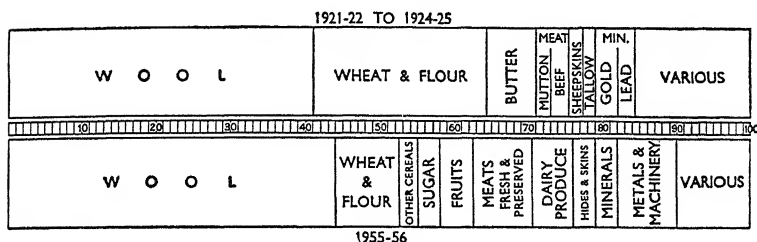


FIG. 163.—The exports of Australia.

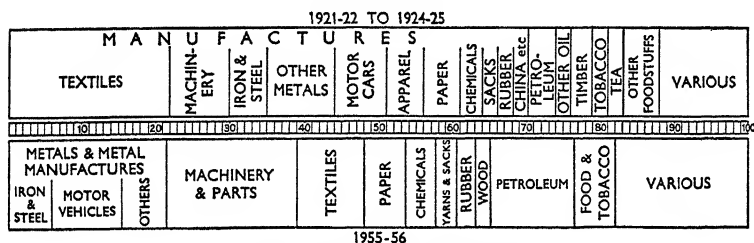


FIG. 164.—The imports of Australia.

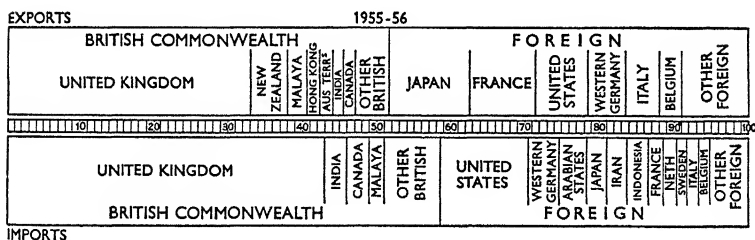


FIG. 165.—The direction of the foreign trade of the Commonwealth of Australia.

Imports. Nearly all the leading imports are manufactured goods which at present can be produced more cheaply in other countries than in Australia. A few of the imports are foodstuffs or raw materials, such as tea and soft timber, which may be produced in Australia in the future.

Direction of Trade. Taking the average of 1920-50, more than half the exports of Australia go to other parts of the British Commonwealth; 40 per cent. going to the United Kingdom alone. Since

the end of the Second World War Egypt, France, Indonesia, United States, Italy, and India have been Australia's best foreign customers. Of the imports nearly 40 per cent. come from the United Kingdom, and 10 to 20 per cent. from the United States.

Ports. A very large proportion of the foreign trade of the Commonwealth passes through the five capital cities and ports of Sydney, Melbourne, Adelaide, Brisbane, and Fremantle (Perth). These five have 80 per cent. of the whole trade, Sydney and Melbourne accounting for half the whole. The minor ports, roughly in order of the importance of their trade, are: Newcastle, Townsville, Cairns, Hobart, Port Kembla, Whyalla, Geelong, Port Pirie, Launceston, Townsville, Cairns, Bunbury, and Wallaroo. In the case of the first four the trade is over a million tons annually. Darwin's sea trade is small, but Darwin has become the "front door" into Australia for air services.

THE STATES AND NATURAL REGIONS OF AUSTRALIA

QUEENSLAND

With the exception of Tasmania, none of the states of Australia forms a complete natural region, as in each case the inland boundaries are almost entirely artificial in character.

Queensland falls quite simply into three main regions:

- (1) The Queensland Highlands.
- (2) The Great Artesian Basin.
- (3) A fragment of the Western Plateau of Australia.

The Queensland Highlands. This belt of country, varying from 100 to 300 miles wide, stretches from Cape York in the north to the borders of New South Wales in the south. There is, as a rule, little coastal plain. Instead, a belt of hard granitic rocks gives rise to a series of coastal ranges, which have rendered very difficult the construction of the coastal railway line from Brisbane to Cairns. The coast is fringed with many rocky islands—the result of a sunken coastal block—and for 1,200 miles the Great Barrier Reef runs parallel to the coast. Between the reef and the shore is a shallow inland sea, well protected from the stormy waves of the Pacific. Through this sea ply steamers between the Far East, Singapore, Java, and Australia, and a voyage in one of them enables one to appreciate the rocky nature of the coast. Southwards from the end of the Barrier Reef several large sandy islands fringe the shore, and there are larger areas of comparatively level land. Behind the coastal granite ranges are large areas of hard, old sedimentary rocks, culminating in the Great Dividing Range. In many places the old

rocks are rich in minerals, and the principal towns are either in the mining districts or have arisen as ports for them. Thus Cooktown is the outlet of the Laura Goldfield; Cairns of the Chillagoe tin and copper mines; Townsville of the Charters Towers Goldfield; and Maryborough of the Gympie mines. Rockhampton (35,000 in 1947) is particularly important, as it is situated on the Fitzroy

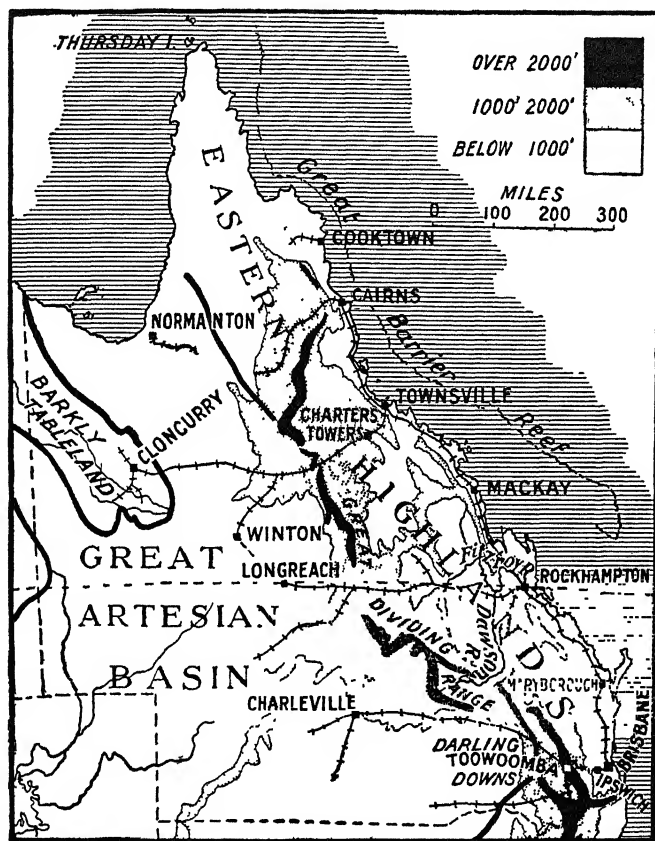


FIG. 166.—Queensland.

Important bauxite deposits have been opened up along the western coast of York Peninsula and the great mining centre of Mount Isa is west of Cloncurry.

River, exports the copper and gold of the famous Mount Morgan gold mines, and, as it commands a most important gap in the Eastern Highlands, is the outlet for the products of the interior. Several of these ports—Cooktown, Townsville, and Rockhampton—command breaks in the ranges and are linked by rail with the interior, so that the Artesian Basin forms their hinterlands. Owing to the difficulty of communication along the eastern coast of Queensland,

and the important breaks in the ranges, a larger number of seaports have grown up than in any other state, and Queensland has so far been able to avoid the excessive concentration of population in the capital.

The greater part of this region lies in the tropics, and the northern coastal zone is the only part of the Australian tropics which enjoys a uniform and reliable rainfall, owing to the fact that it receives both the monsoons and trades. This, together with patches of very fertile soil, makes the coastal region, and the Alberton tableland behind it, the only portions of tropical Australia which appear really favourable for close agricultural settlement by any race. Here, despite the fact that level agricultural land is not abundant, Australia has settled 185,000 people—British and Italians. These healthy and vigorous settlers engage in all usual occupations, including the heavy manual labour of the sugar industry, and, although the experiment is very recent, form one of the largest and most promising groups of North European whites in the tropics. Sugar-cane is the outstanding crop, but many tropical plants can be grown. This region, for example, produces nearly all the pineapples grown in Australia. Mackay is the chief sugar-manufacturing centre and port; other sugar ports are Bundaberg and Maryborough. Many of the rivers of the area reach the coast through deep gorges and over fine waterfalls (*e.g.* the Baron Falls near Cairns), but the larger Fitzroy River has a broader valley with fine cattle pastures and has become a centre of population. The rich but undeveloped Dawson Coalfield lies in this valley.

Brisbane (464,000 in 1952), the capital city, lies in the south on the Brisbane River, a few miles from the sea. The mouth of the river is protected by Moreton Island. Near the capital is *Ipswich* (36,000 in 1952), a manufacturing town on the most important coalfield in Queensland. At the back of Brisbane, on the surface of the plateau, are the fertile Darling Downs, the chief centre of which is Toowoomba (40,000 in 1952). Thus the capital owes its importance to the fact that the Brisbane River has been made navigable by dredging, that it is the centre of the railway system and commands the produce of the Darling Downs and the Ipswich coalfield.

The Great Artesian Basin. The great Artesian Basin may be divided into two parts:

(a) The south-western, forming part of the Lake Eyre region of inland drainage, and constituting an arid region containing only a few scattered stock. Opals are found near Winton.

(b) The eastern and larger part, forming the great cattle-ranching area of Queensland. This cattle-raising region of Queensland lies between the isohyets of 10 and 20 inches, and corresponds to the savana belt. In the north, around the shores of the Gulf of Carpentaria, are low-lying areas with mangrove

swamps and scrub forest, but the greater part of the region is one of rich grass with scattered trees. On the borders of the Gulf lies *Normanton*, the chief town. As already mentioned, the stock-raising districts are connected by rail through the highland gaps with the east-coast ports of Cairns, Townsville, Rockhampton, and Brisbane. The artesian water is used mainly for watering the stock. In the more temperate south sheep become important, and this part of Queensland adjoins the Wheat Belt of New South Wales.

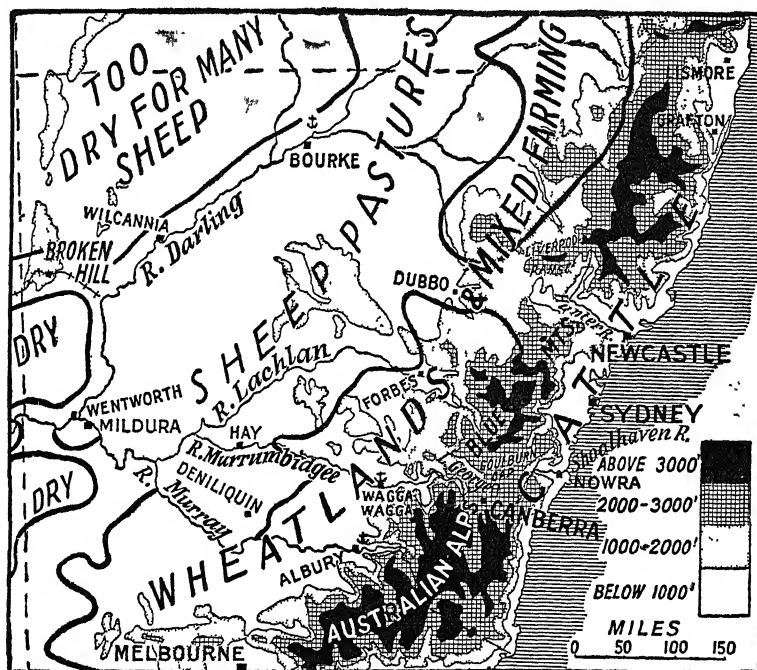


FIG. 167.—New South Wales.

The Western Plateau. Near the borders of the Northern Territory (formerly North Australia) Queensland includes a portion of the ancient rocks of the Western Australian tableland. This tract is known as the Barkly Tableland, and consists of well-grassed country. On the borders of the plateau lies Cloncurry, an important copper-mining centre, connected with Townsville by rail.

An important project to link Cloncurry with Darwin by railway would place the eastern states in comparatively quick communication with India and Europe, *via* Darwin, and such a railway would also open up important areas of grassland at present practically uninhabited. Instead it is the railway and road from Darwin to

South Australia which has actually been constructed. There is at present a well-marked "stock route" from Western Queensland through North Australia to Darwin.

NEW SOUTH WALES

The Mother State of the Commonwealth is still in many respects the most important. It has the largest population and the largest foreign trade, the largest coalfields and by far the largest number of sheep. It can be divided into a number of natural regions which agree closely with those of Queensland:

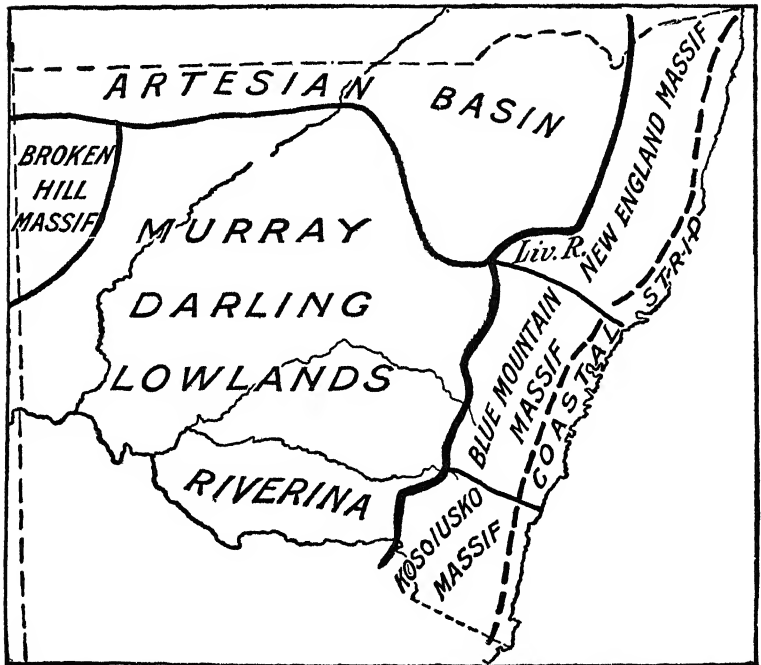


FIG. 168.—The natural regions of New South Wales.

- (1) The Eastern Highlands of New South Wales.
- (2) The Central Lowlands, comprising:
 - (a) The southern part of the Great Artesian Basin.
 - (b) The major part of the Murray-Darling Basin.
- (3) The Broken Hill Massif in the extreme west.

The Eastern Highlands. The Eastern Highlands in New South Wales form a somewhat narrower belt than in Queensland, not as a rule exceeding 150 miles in width. They may be divided into three parts:

(a) The New England Massif in the north, stretching as far south as the Liverpool Range and the Hunter Valley.

(b) The Blue Mountains Massif, stretching roughly from the Hunter Valley to the Goulburn Gap.

(c) The Kosciusko Massif, from the Goulburn Gap to the Victorian border.

The New England Massif consists of old sedimentary rocks invaded by masses of granite. The eastern slopes are rugged but are well wooded, and comprise one of the few soft-wood areas in Australia, the red cedar in particular being highly prized. The drier western slopes are less rugged and are devoted to agriculture and sheep-rearing. The present main railway from Brisbane to Sydney runs through this district, of which Armidale is one of the main centres. The "English" character of the country is marked by flourishing deciduous trees—especially apples. Lower down the western slopes one passes into the Wheat Belt.

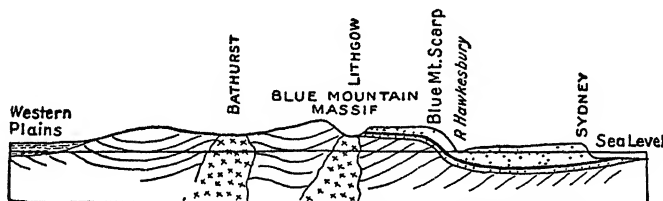


FIG. 169.—Section from west to east across the Blue Mountain Massif.

Between the New England Plateau and the sea is a coastal strip of varying width, watered by the "North Coast Rivers"—the Tweed, Richmond, Clarence, Macleay, and Manning. In the north sugarcane is grown, and the whole area is an important dairying region. Murwillumbah, Lismore, and Grafton, now connected with Sydney by the North Coast Line, are the main centres of this delightful country.

Special mention may be made of the broad and fertile Hunter Valley, which separates the New England and the Blue Mountain massifs, forming the important Hunter River Gap and Cassilis Gate to the interior. The valley is renowned for its fertility, though liable to serious floods. At the mouth is Newcastle (137,000 in 1952), the principal coal port of Australia, and a manufacturing centre which is greatly increasing in importance.

The Blue Mountain Massif consists essentially of a broad flat-topped plateau formed of dry massive Hawkesbury sandstone. The remarkable and sudden eastern edge of the Blue Mountains is due to a type of fold known to geologists as a monocline, illustrated in Fig. 169. Thus the coastal strip north and south of Sydney

consists of exactly the same sandstone as the Blue Mountain Plateau, which is nearly 3,000 feet higher. This plateau has been dissected by a series of remarkable valleys formed by rivers, which have cut through the hard sandstone and rapidly eaten into the softer beds below and emerge on to the coastal plains through impassable gorges. On the Blue Mountains a number of pleasure resorts—Katoomba, Leura, etc.—have sprung up, and the residential suburbs of Sydney stretch northwards to the sandstone areas. Along the coast are several drowned valleys, affording excellent harbours. Of these Port Jackson (Sydney Harbour) and Broken Bay (which receives the Hawkesbury River) are the most famous. Notice that the so-called “Parramatta River” is only a short arm of the sea, and that no river empties itself into Sydney Harbour. This is one reason why the harbour remains free from sediment. Underlying the Triassic Hawkesbury sandstone are the coal-bearing beds which yield the coals of the Newcastle and Illawarra districts. The coal seams are exposed or are near the surface along the coast south and north of Sydney, and at Lithgow on the western side of the Blue Mountains. At Sydney the coal measures lie at a depth of 2,800 feet, the whole forming “a huge black saucer, extending under the whole country from Newcastle to Lithgow in the west, and to Bulli in the south.”

Sydney, the capital (899,000 inhabitants in 1921, 1,621,000 at the end of 1952), owes its importance to its splendid harbour, fine climate, rich hinterland, and midway position between the coalfields of Newcastle and Wollongong, as well as to political and historical associations as the capital and mother city. It contains some 50 per cent. of the inhabitants of New South Wales, and is the fourth town in the Commonwealth in size. In March, 1932, North Sydney was connected with Sydney across the harbour by the largest single-arch bridge in the world. Around Parramatta a layer of clay covers the sandstone and supports a number of orchards. Farther south, in the lower valley of the Shoalhaven River, is an important dairying centre. Nowra is the collecting centre and railhead for this tract.

On the western side of the Blue Mountains Plateau, Lithgow (16,560 in 1952) uses its coal for important manufactures, such as that of small arms. Farther west are volcanic rocks associated with the old sedimentary rocks, and this drier region approaches the Wheat Belt.

The Kosciuszko Massif, lying south of the Goulburn Gap and Lake George, boasts the highest mountain in Australia—Mount Kosciuszko. Mount Kosciuszko is a granite boss rising to 7,350 feet above sea-level, but the surrounding country, though fine, has not the essentially rugged character of fold mountains in other parts of the world. Amongst the hills of the massif lies the Federal Capital—Canberra.

Some of the heavy rainfall of the region will be caught by the Burrinjuck Dam and Hume Reservoir already mentioned. The area is at present a cattle district. The coastal strip is not very distinct but the flatter land round the river mouths affords excellent pasture for dairy cattle.

The Central Lowlands. Although the northern part of the Central Lowlands in New South Wales forms part of the Great Artesian Basin, whilst the bulk belongs to the Murray-Darling Basin, there is little difference between the two parts. Generally speaking:

- (a) The land slopes away gradually from the borders of the Eastern Highlands towards the west.
- (b) The rainfall decreases from east to west, and the type of industry changes accordingly.
- (c) The rivers are more constant in the south than in the north, so that more water is available for irrigation.



FIG. 170.—Section across New South Wales from west to east.

For the most part the lowlands are occupied by young sedimentary rocks, but near the Eastern Highlands patches of older rocks may appear from beneath the younger cover and give rise to such mining centres as those of Cobar and Wyalong.

The famous Wheat Belt forms a broad strip along the east of the region, being roughly limited on the west by the 20-inch rainfall line. Amongst the agricultural centres of this belt may be noted Dubbo, Forbes, Wagga Wagga, Albury, and Corowa.

The sheep country on the whole lies mainly to the west of the Wheat Belt, and it is in this country that great irrigation developments are taking place. It would perhaps be more correct to state that the main Sheep Belt coincides with the Wheat Belt, but that sheep thrive also both in the more hilly regions on the slopes of the Eastern Highlands and in the drier regions (with a rainfall of 10 inches or less) west of the Wheat Belt. Thus, towns like Bourke, Hay, Deniliquin, Wilcannia are important wool centres, but lie outside the wheat area. Wilcannia is a river port on the Darling.

Special mention may be made of the famous "Riverina," lying between the Murrumbidgee and the Murray. The eastern part is in the Wheat Belt, the western part in the pastoral belt. The soil is famed for its fertility, but its full fertility can only be developed by irrigation.

In the extreme south-west the Murray-Darling Basin is still

drier, and depends entirely on irrigation for development. Wentworth is a river port lying in this area, but at present the Victorian settlement of Mildura is the most important of the irrigated tract.

Broken Hill Massif. This mass of old rocks is a continuation of the South Australian Highlands, and lies near the western border of New South Wales. The immensely rich silver-lead deposits lying in saddle lodes made Broken Hill famous. Great quantities of zinc were also obtained, and this metal became one of the most important on the field. The mineral riches of Broken Hill have attracted a population of some 33,000 people. Owing to the factor of distance the outlet of the field was Port Pirie on Spencer Gulf in South Australia. A railway has been completed from Broken Hill to Sydney, *via* Menindee and Condobolin, but the distance is so great that it scarcely affected the transport of ore through the South Australian port. Mining is still active although the original mines are now closed.

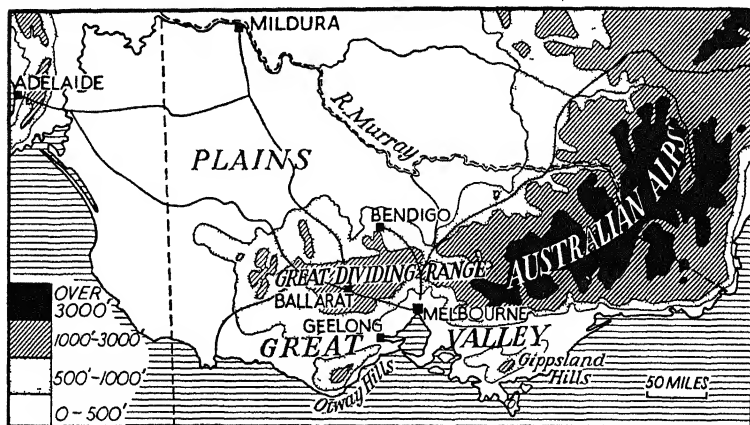


FIG. 171.—The natural regions of Victoria.

VICTORIA

In Victoria the main mountain divide has swung round into an east-and-west direction. At the same time the coastal strip has increased greatly in breadth and altered somewhat in character. We find that the State can be divided into four natural regions:

- (a) The Mallee Scrub country and Wimmera District, lying north of the Victoria Mountains and forming part of the Murray Basin.
- (b) The Victorian Highlands.
- (c) The Great Valley of Victoria.
- (d) The Otway and Gippsland Hills.

The Murray Basin. North of the Victorian Highlands lies the continuation of the Wheat Belt of New South Wales. To the north-west lies the mallee scrub country, which, in spite of attempts in the 1920's to develop it as wheat land, remains mainly pastoral. We have already mentioned the use made for irrigation of the Goulburn and Loddon rivers, and of the Murray itself below Echuca and in the fruit-growing settlement of Mildura.

The Murray Basin is also one of the great sheep-farming regions of Victoria. Echuca, on the Murray, only 160 miles by rail from Melbourne, through the low Kilmore Gap, is one of the leading centres in this part of Victoria.

The Victorian Highlands. Like the New England Highlands, the Victorian Highlands consist of old sedimentary rocks, penetrated by the masses of granite, and in places covered by flows of basalt (as at Ballarat). The Highlands are loftier in the east, where they are known as the "Australian Alps," and have more than a dozen peaks exceeding 5,000 feet in height. Of these Feathertop with its snowy cap (6,300 feet) is one of the best known. The Australian Alps form the feeding ground of the headwaters of the Murray and the Snowy used for irrigation in the Murray valley. Amongst the Victorian Highlands lie several of the most famous of the Australian goldfields—Bendigo, Ballarat, and Castlemaine—although few of these centres now have a great production. The western part of the Highlands is lower and drier and may be described as rolling uplands well suited to wheat. An important centre is Ararat. The vine flourishes in this part, and over the whole area much land is devoted to sheep.

The Great Valley of Victoria. To the south of the Victorian Highlands lies the Great Valley of Victoria, separated from the sea by the low Otway and Gippsland Hills. The Great Valley is divided into two halves by Port Phillip Bay. The eastern half is a fertile dairy-farming country, studded with lakes, and known as Gippsland. Sale and Morwell are the chief centres of this part. Farther west lies thickly timbered country with some of the largest hardwood eucalypts in Australia. Port Phillip Bay is the central part of the Great Valley which has been drowned by the sea. Notice the excellent position of *Melbourne* (1,393,000 inhabitants in 1952) at the head of the bay. It is the natural geographical centre of Victoria, and no other position is possible for a town to command both ends of the Great Valley as well as the country north of the Highlands through the Kilmore Gap. Most of the larger ships berth at Williamstown and Port Melbourne, but the Yarra is navigable for vessels of considerable size. Along the shores of Port Phillip Bay are numerous pleasant suburbs and pleasure resorts.

Geelong (49,000 in 1952) is a small but interesting industrial centre, lying at the head of Geelong Harbour, an inlet on the west

side of Port Phillip Bay. It has a number of woollen mills, and its hinterland, the western half of the Great Valley, is part of the great Victorian sheep country. That part of the Great Valley lying around and west of Port Phillip Bay has rich volcanic soils—hence the old designation “Australia Felix.” Large areas are devoted to wheat and vegetables, but sheep largely take the place of the dairy cattle of the eastern parts of the valley. *Hamilton* is the main centre of the western part of the valley, and was long

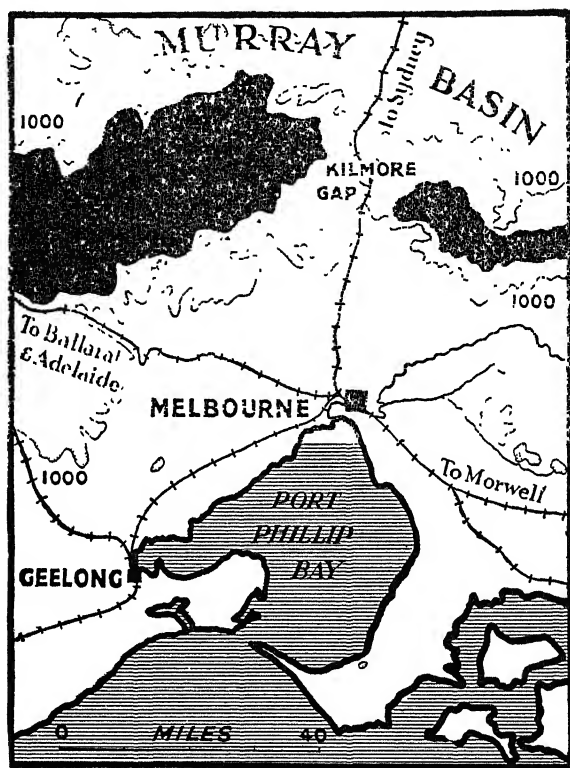


FIG. 172.—The position of Melbourne.
Land over 1,500 feet shown in black.

famous as producing some of the finest wool in Australia. *Portland* on the coast, is of interest as having been as early as 1834 the site of the settlement of the Hentys.

The Otway and Gippsland Hills. These low hills attract a heavier rainfall than the Great Valley to the north, and are largely forested. Dairy-farming is increasing in importance, and there are numerous butter factories.

TASMANIA

Physically Tasmania is a continuation of the Eastern Highlands, and is thus comparable in some ways with a fragment of the highland regions of New South Wales or Victoria. In climate, however, Tasmania is distinct from any region on the mainland. Apart from the moderating influence on temperature exerted by the sea all round, Tasmania is farther south and so cooler on the whole than any part

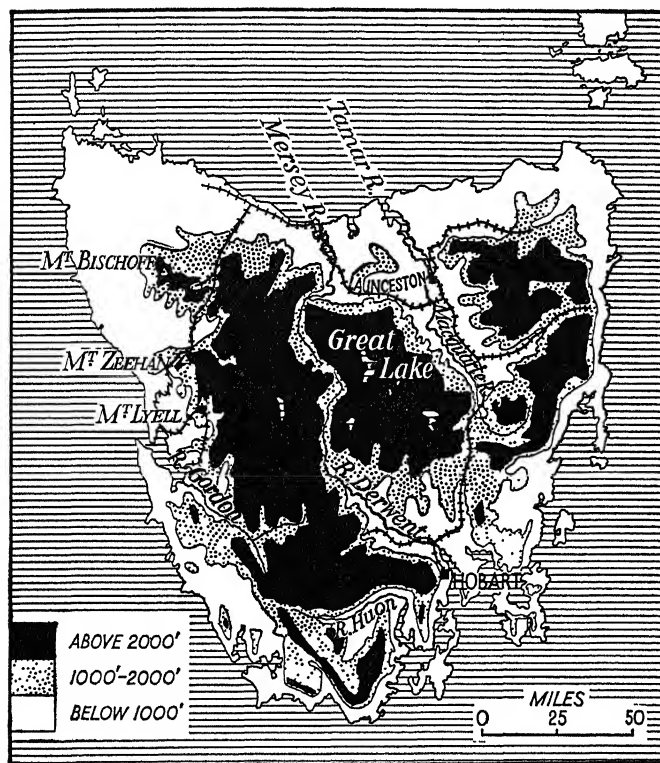


FIG. 173.—Tasmania.

of the mainland. Moreover, it lies entirely within the Westerly Wind belt, and as a result has a good rainfall well distributed throughout the year.

Tasmania is about 200 miles from north to south, and 200 miles from east to west. Bass Strait separating it from the mainland is 150 miles wide, but is only shallow and represents the position of the drowned isthmus which once united Tasmania with the mainland. Geologically Tasmania resembles Victoria or the highlands of

New South Wales, and consists of old, hard, sedimentary rocks penetrated by granite masses. The latter give rise to the main mountain ranges, and with them are associated the famous mining areas of Mount Lyell, Mount Bischoff, and Mount Zeehan. The chief mountain block, with peaks rising to 5,000 feet, lies in the north-west. To the east of this lies the remarkable central plateau, nearly all over 3,000 feet above sea-level. It has been deeply dissected by the Derwent and its tributaries, and isolated portions give rise to the mountainous area of the south-west. By far the most important parts of the island are the larger river valleys and coastal lowlands lying in the eastern half.

On the whole Tasmania is higher and more rugged on the west than on the east (though the highest point, Legge's Peak, is actually on the north-east). Since the prevailing winds are westerly, there is a heavy rainfall on the west and a much lower rainfall on the east, under the rain shadow of the central plateau. Practically the whole west coast receives 50 or more inches a year, with as much as 100 inches on the west coast range behind Zeehan, but the rainfall on the eastern and central river valleys is as low as 20 inches. Ben Lomond in the north-east receives only 60 inches, in spite of a height of over 5,000 feet. As a result the western mountains are often covered with dense forests of beech and soft-wood conifers, and present an appearance curiously different from that of the remainder of Australia. This western forest country is wild in the extreme and is consequently little developed. In this region occurs the "Horizontal Scrub," which builds up a tangled mass of branches 30 or 40 feet above the ground, so impenetrable that in places the traveller can pass over the top.

Tasmania possesses important zinc, copper, silver, lead, gold, and tin mines, while fair coal is obtained at Fingal in the east and other places. Owing to rainfall and soil, Tasmania is pre-eminently an agricultural and fruit-growing country. The island is the fourth fruit-growing state of the Commonwealth in acreage, and now leads Victoria in the production of apples. In regard to potatoes her crop is of great importance. Parts of Tasmania are rather too damp and cold for sheep: the average weight of a fleece is less than in other parts of Australia. But the sheep, living in a more bracing climate, are very healthy, and numbers are sent regularly to the mainland to keep up the strength and health of the flocks there.

A very important development in recent years is that of hydro-electric power installations. In particular the waters of the Great Lake, on the central plateau, are diverted into works a thousand feet lower in the Ouse Valley. The island is so small that the electric energy thus generated can be transmitted to all parts of the island. Tasmania has little coal, but the hydro-electric power available is utilized by various factories—notably large metallurgical works near

Hobart, where Risdon contains very important electrolytic zinc works. Tasmania has great possibilities in extending her water-power in manufacture and transport. The installed capacity in 1953 of about 220,000 kW. is only a fraction of the potential 1,750,000 kW.

The population of Tasmania numbers some 311,000 (1953). Owing to the mountainous nature of the country it is densest on the narrow coastal lowlands or in the valleys of the principal rivers, especially in the less rugged east. There are, however, important population groups in the western mining areas. Owing once more to the character of the country the population is more scattered than in the mainland states.

Hobart (94,000 in 1953), the capital, is situated on the excellent natural harbour formed by the inlet of the Derwent, which makes it the port of a flourishing fruit and hop-growing district. It is also increasing in importance as a manufacturing centre. *Launceston* (51,000 in 1953), the most important town in the north, is about half the size of Hobart. It stands at the head of navigation on the Tamar, possesses a rich agricultural and pastoral hinterland, and commands most of the trade with Victoria.

SOUTH AUSTRALIA

South Australia is divided by its physical features into a number of distinct regions.

- (1) The south-east lies in the lower part of the Murray Basin.
- (2) The South Australian Highlands, comprising the Mount Lofty Range in the south and the higher Flinders Range in the north. Kangaroo Island is a southern continuation of the Highlands.
- (3) The Rift Valley or Sunklands, which contains Spencer Gulf, St. Vincent Gulf, Yorke Peninsula, Lake Torrens, and important and fertile plains such as the Adelaide Plains.
- (4) The north-east, which lies in the Lake Eyre Basin of inland drainage, and forms a part of the Great Artesian Basin.
- (5) The west and north-west, which forms part of the Great Australian Plateau. In the south this region passes gradually into lower ground, in the west to the Nullarbor Plain, in the east into Eyre's Peninsula.

The chief physical features of South Australia—the younger mountains, the Great Rift Valley, and the lower course of the Murray River—run from north to south, but the older mountains of the north and the very important rainfall lines (general trend) run from west to east.

Nearly all the population and agricultural development are concentrated to the south of the 10-inch rainfall line. The border of the dry zone is marked by "Goyder's Line"—the 14-inch isohyet.

The Murray Basin. The last 400 miles of the course of the Murray are in South Australia, but all the water in the river is received from New South Wales and Victoria. Although in times of drought the river may become so shallow that a man may wade across, the lower Murray is usually deep enough for continuous navigation by river steamers. In times of flood the stream overflows its banks and gives rise to shallow lagoons and billabongs. In order to regulate the flow the Lake Victoria storage scheme has

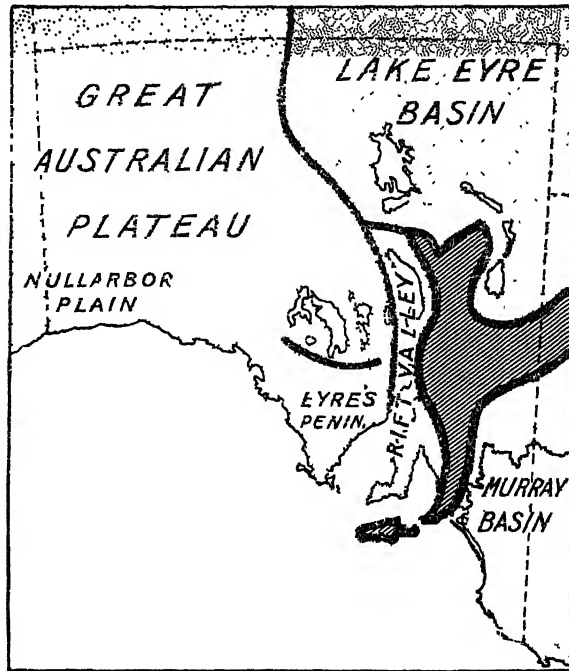


FIG. 174.—The natural regions of South Australia.

The South Australian Highlands are darkly shaded.

been devised, and nine locks have recently been constructed. The waters of the lower Murray yield large numbers of fish, especially the Murray cod, but the main use of the river is for irrigation. The flood plains are, if necessary, levelled and the water pumped up from the river. Oranges, grapes, and deciduous fruits are the principal products of the irrigated gardens. Wine is also made. The largest irrigation settlement is at Renmark, but there are others. In the lower course of the river, below the bend town of Morgan, old swamps have been drained and afford rich land for vegetable gardens and cow pastures. The river steamer service has greatly declined with the coming of the more speedy railways, which have tapped the

stream at Morgan, Murray Bridge, and other places. The locking scheme, however, provides for the needs of navigation. A sand-bar hinders access from Lake Alexandrina and the river to the ocean, and just above the mouth barrages have been built to prevent the salt water from entering the lakes from the sea. The artesian water available in the basin is used mainly for watering stock.

In the extreme south-east of South Australia lies the beautiful Mount Gambier, an isolated extinct volcano. Here volcanic soils cover the limestone plains for an area of some twenty-five square miles, making a fertile pocket well suited to vegetables. The remainder of the region is important for sheep, but wheat-growing is increasing in many places. The mallee lands south of the Murray, for instance, are now producing over 2,000,000 bushels of wheat per annum.

The South Australian Highlands. The Central Highlands and the rift valley of South Australia have been formed by earth movements crushing the strata against the West Australian stable massif of old rocks. The hills of the South Central Highlands, including the Mount Lofty Range, although they rarely attain a height of 2,000 feet, attract a heavier rainfall than the surrounding lowlands. There are many beautiful forested slopes, from which firewood as well as timber for mines and for sleepers is obtained. The principal trees are the red gums and the stringy barks, but pines grow well when planted. Fruits—especially the vine—flourish on the cleared hillsides with a western aspect and a rainfall of about 25 inches. South Australia possesses nearly half the vine acreage in the Commonwealth, and produces over 70 per cent. of Australia's wine, largely in this region. Olive trees are grown and olive-oil is produced. The rich soil in the valleys is planted with vegetables, and many sheep are reared. Dairy-farming and the production of butter and cheese are important. The rain-water of the highlands is impounded in a number of reservoirs. The highest peak of the Mount Lofty Range is Mount Lofty itself (2,334 feet) just to the east of Adelaide. Farther north the ranges open out and the rainfall is less. Here are broad fields devoted to wheat and mixed farming. Large numbers of sheep and cattle also flourish. The famous Burra and Kapunda copper mines were in this region. Farther north, commencing about Port Pirie, are the Flinders Ranges. These ranges, though of greater altitude, are drier than the Mount Lofty group of hills, but are still of sufficient altitude to attract a larger rainfall than the surrounding plains. Notice how the 10-inch rainfall line curves northwards so as to include these hills. The gum trees grow mainly near the streams, and though smaller than in the southern group of hills, furnish useful wood. Both wheat and stock are important. The main railway from Adelaide to Port Augusta crosses the Flinders Range by the beautiful Pichi Richi Pass.

A branch of the main Flinders Range connects up with the famous Broken Hill District of New South Wales.

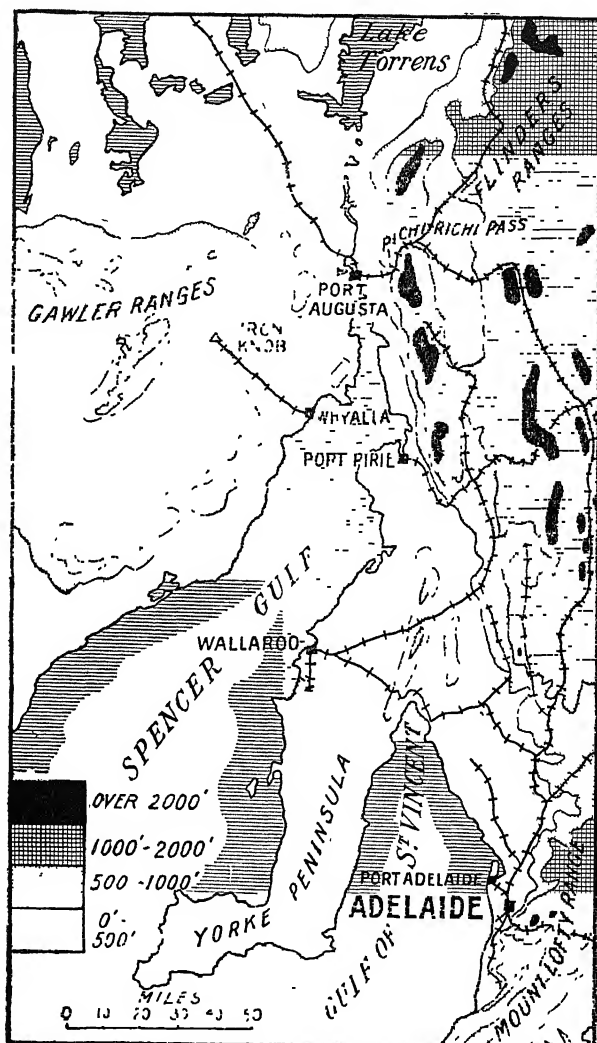


FIG. 175.—The South Australian rift valley or Sunklands.

The Sunklands or Rift Valley. The plains which lie along the Sunklands to the west of the Central Highlands possess no general name but cover a considerable area—from Adelaide in the south to the neighbourhood of Lake Torrens in the north—and include Yorke Peninsula. The southern part of the plains, where the rainfall

is more than 10 inches a year, constitutes the most important part of South Australia, and here the majority of the people live. This is the great wheat-growing region as well as the leading sheep-farming area. There are numbers of vineyards in areas of fair rainfall, especially near the Mount Lofty foothills.

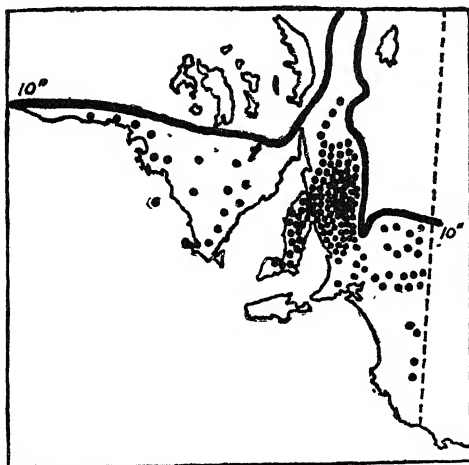


FIG. 176.—The distribution of wheat in South Australia.

The ten-inch rainfall line roughly delimits the wheatlands.

Adelaide (with suburbs 459,000 in 1953), the State capital, lies in the south of this region. It was founded by Colonel Light in 1836–37, and the fine plan of the present-day city is largely the result of his forethought. The city is built on two low plateaus on either side of the River Torrens, and is divided into North and South Adelaide. The existence of the Torrens Valley makes drainage an easy matter, whilst the rainfall of the highlands supplies ample water through the reservoirs in the Mount Lofty Ranges near by. Port Adelaide was originally built on the banks of the well-sheltered Port River estuary, but the increasing size of ships has rendered necessary the construction of an outer harbour. Large manufacturing districts have grown up on the plains between the city and harbour, and many industries are carried on near the waterfront. *Walleroo* is increasing in importance as a wheat and wool port, and manufactures chemical fertilizers. *Port Pirie* (12,000), the second port of the State, owed its growth to the Broken Hill mines 250 miles away. It smelts and exports silver, lead, and zinc, and imports coal (from New South Wales) and merchandize from Broken Hill, but it is also increasing as an export centre for wheat and wool. On the shore of Spencer Gulf opposite to Port Pirie is Whyalla, the port of the Iron Knob and Iron Monarch mines, whence iron ore is

shipped to Newcastle and Port Kembla in New South Wales. *Port Augusta*, at the head of Spencer Gulf, is the starting-point for the Trans-Continental Railways. It has a fine harbour, and ships wheat and wool. The other towns of the plains are mainly agricultural centres, but the salt industry of Yorketown in the Yorke Peninsula should be noted.

The shallow Lake Torrens area in the north of the Rift Valley receives a very low rainfall. Pasturing is the only industry of importance.

The Lake Eyre Basin. The Lake Eyre Basin of inland drainage is an arid undeveloped region. During the occasional years of good rainfall numbers of sheep could be supported, but as there is no means of escaping the inevitable years of drought and heat, the number of sheep and cattle pastured is not very great, and sheep-runs formed under temporarily favourable conditions have been deserted. Much of the Lake Eyre Basin lies in the Great Artesian Region, and the artesian water is used to keep open the important stock routes. The railway to Alice Springs runs along the southern and eastern margins of the Lake Eyre Basin, but the iron road with its weekly train has not resulted in any extensive settlement.

The Western Plateau. A third of South Australia—the north-west—forms part of the arid plateau of Western Australia. The plateau region is devoid of white inhabitants, except along the southern and eastern margins, where a few cattle are raised and sheep are increasing in numbers with the sinking of bores and the construction of dog-proof fences. Opal is found in Stuart's Range. To the south-west lies the treeless limestone plain known as the Nullarbor Plain. To the south-east the plateau passes gradually into the salt-lake region round Lake Gairdner and then gives place to the low sandy hills of the Gawler Ranges, composed of ancient granitic rocks. South of the Gawler Ranges lie Eyre's Peninsula and a strip of coastal lowlands, which as far west as Fowler's Bay possess a rainfall of from 12 to 25 inches, a rainfall which is, in addition, comparatively regular. With the advent of scientific farming this region is becoming a great wheat and sheep country, with Port Lincoln as the chief port. The famous Iron Knob, with its port Whyalla, lies to the north-east of the Peninsula. Eyre's Peninsula and the west coast are a region of great promise.

WESTERN AUSTRALIA

Western Australia is by far the largest of the States, and occupies a third of the whole continent. With the exception of the Northern Territory it is perhaps the least developed of the States, but the one in which marked progress is most to be expected. About a third of this huge area lies in the tropics; about two-thirds in the temperate zone.

Physically the whole belongs to the great Western Plateau, and it is only possible to separate a narrow coastal strip down the west coast.

Geologically the plateau, as already explained, consists of a mass of old crystalline rocks in the south, and of a complicated series of very old sedimentary rocks in the north. In the south-east the Nullarbor Plains consist of a nearly horizontal limestone covering the old rocks.

Climatologically the north-west coast has a tropical climate with a monsoonal rainfall; the south-west is a typical Mediterranean region. In both cases the rainfall decreases inland as one approaches the arid interior.

In a very broad sense Western Australia falls into three natural regions, which are defined by rainfall rather than by topography:

- (a) The Tropical Lands of the north and north-west.
- (b) The Mediterranean Regions of the south-west.
- (c) The Dry Lands of the interior.

The Tropical Lands of the North and West. The whole area corresponds roughly with the Tropical Grasslands or Savana. Along the wetter north is a belt of savana woodland, where trees are more abundant. Practically the whole region has more than 10 inches of rainfall a year, and along the north coast it is locally more than 50 inches.

The savana and savana woodland afford good cattle country. The drowned coastline provides excellent harbours. Meat-chilling works were established at Wyndham but later plans have focused on the development of the Kimberley area with the building of many miles of road and major bridges. Irrigation may follow. Other outlets of the country are the small ports of Derby (on the Fitzroy River) and Broome. The position of artesian basins awaiting development should be noted (Fig. 158).

The Mediterranean Region ("Swanland"). Along the west coast is a coastal strip enjoying a good winter rainfall. This falls into two parts:

- (1) The Perth Region, which consists of recent sands and limestones and has an underlying artesian basin giving a good water-supply. The natural vegetation is Tuart Forest, but amongst the sandhills are numerous swamps. These, when drained, afford excellent agricultural land—especially for vegetables—and magnificent dairy pastures. Towards the scarp of the plateau the fertile soils are excellent for the growth of vineyards, and considerable quantities of wine are produced. A more recent development is citrus-fruit farming.

Perth (351,000 in 1953), the capital of Western Australia, lies in this region, beautifully situated on the broad shallow Swan River.

At the mouth of the river lies *Fremantle*, the chief port, included within the metropolitan district and population of Perth. *Bunbury*, at the southern end of the region, is a small port for timber and other produce.

(2) The Greenough Region, to the north of the Perth Region, has a rainfall of 15–20 inches, and is therefore suited to wheat. *Geraldton* is the port of this region.

On the plateau itself in the Mediterranean climatic belt lie two regions:

(3) The Jarrah Region, with a rainfall of more than 25 inches, is so called because it is the home of the jarrah forests. In the

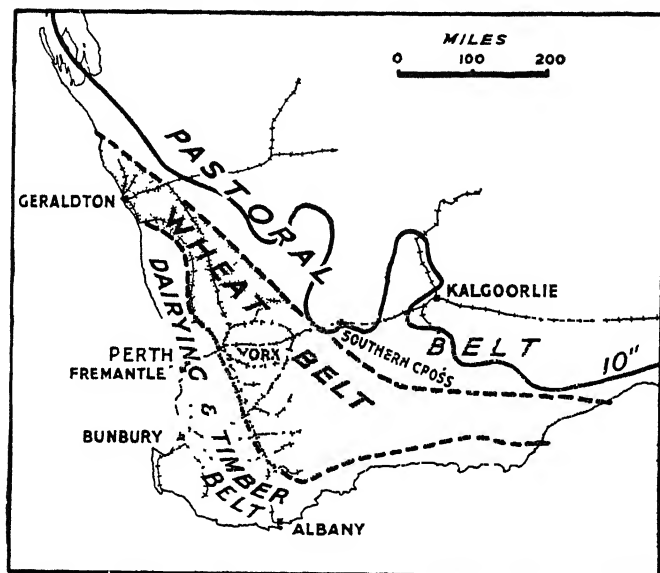


FIG. 177.—Swanland.

wettest parts of the south-west are the fine karri forests (rainfall 40 inches). Much of the country is suited to fruit orchards and dairy-farming. The region is bounded on the west by the Darling Fault scarp. *Albany*, occupying a fine position on King George Sound, lies to the south-east of the region, but also serves the Wheat Belt.

(4) The Wheat Belt occupies a strip of the plateau having a rainfall of between 10 and 25 inches. The growing of wheat has spread rapidly in recent years, and is capable of much greater development. The belt is well served by railways. *York* is an important centre. To the east, where the country is a little dry for wheat, sheep-farming is the leading occupation, but wheat is gradually pushing into the pastoral belt, as at Southern Cross.

The Dry Interior. The Kalgoorlie Region, rendered famous by the goldfields of Kalgoorlie, is marked off from the wheat belt merely by decrease in rainfall. *Kalgoorlie* (12,600 in 1953)¹ has now another importance as a railway junction, with a break of gauge.

The Nullarbor Plain, of horizontal Tertiary limestone, is covered with salt-bush and blue-bush, and almost entirely undeveloped. The artesian basin unfortunately yields brackish water.

To the north of Kalgoorlie, the rainfall is very low and the natural vegetation is mulga scrub. This fades gradually into the heart of Western Australia, which may be described as a sandy desert. It consists mainly of rolling sandhills sparsely clothed with spinifex. The region is often known as the "Sandridge Desert." To the east on the borders of South Australia come the Central Highlands, where watercourses exist, and where grassland may make pastoral development possible. This highland belt is better marked in the southern part of the Northern Territory and in northern South Australia, where there are the Musgrave and Macdonnell Ranges.

The arid lands of the interior extend to the central part of the west coast, where the Carnarvon Region has a rainfall of less than 10 inches. The presence of the North-West Artesian Basin may make pastoral development possible. In this region lies Sharks Bay, which with Broome was famous for its pearl fisheries before the Second World War.

The recent discovery of mineral oil may greatly alter the economic position of Western Australia.

NORTHERN TERRITORY

The administration of the Northern Territory was handed over to the Commonwealth Government in 1911. In 1947 the Northern Territory was granted a measure of self-government.

The population of the whole enormous area of over half a million square miles is under 11,000, including nearly 1,500 Asiatics and half-castes.

Owing to difficulties of climate and communication there has been little progress in development for the last thirty years. During the First World War the establishment of meat works at Darwin gave a temporary impetus to that port, but Darwin is not well situated in relation to the broad belt of tropical grassland which occurs some distance farther south. Severely bombed in 1942, a completely new city had to be envisaged at the end of the Second World War.

Although much of the soil in North Australia is poor and sandy, the rainfall in the northern part is adequate and the land capable

¹ The population has recently increased greatly with the resuscitation of gold mining. In 1931 it was 5,700.

of some development if capital and labour were available. Agriculture is almost impossible without the help of coloured labour and even then irregular rainfall, poor soils, and isolation present huge difficulties. At present the main industries are cattle-raising, mining, and pearl-shell fishing, and there are considerable prospects for the future in the first two. The whole north, however, is waiting for a comprehensive scheme of development. A railway has been built from Darwin to Birdum near Daly Waters, and much is expected from its extension to meet the railways of southern and eastern Australia at Stuart (Alice Springs) and Cloncurry respectively.

In the heart of central Australia—right in the centre of the continent—lies a tract of land rising above the general level of the plateau (the Macdonnell and Musgrave Ranges, and the Burt Plain). This is said to be good pastoral country with a rainfall of about 10 inches. The administrative centre of the Northern Territory is Darwin, with a Deputy Administrator at Alice Springs.

NEW ZEALAND

Position and Size. The Dominion of New Zealand consists of two large and several small islands in the South Pacific Ocean. They may be grouped as follows:

(a) Islands forming the Dominion proper, over which British sovereignty was proclaimed in January, 1840—the North Island, and the South Island. There are numbers of islets near the coast of each, and the larger Stewart Island to the south of the South Island.

(b) Outlying islands, added to the area of New Zealand by the limits proclaimed for the colony in the years following 1840—Chatham Islands, Antipodes Islands, Auckland Islands, etc.

(c) Islands annexed at later dates—Kermadec Islands (1887), Cook Islands (1901), Niue Island (1901).

A large sector of Antarctica, the Ross Dependency, is also attached to New Zealand. As trustee for United Nations, New Zealand administers the former German possession of Western Samoa and, jointly with Australia and Great Britain, the island of Nauru. The area of New Zealand proper is 103,285 square miles. It became a Dominion in 1907.

Physical Features. The mountainous character of New Zealand is one of its most striking features. The main mountain backbone is higher and broader in the South Island than in the North Island. In the South Island the mountains, known as the Southern Alps, have no less than sixteen peaks over 10,000 feet, including Mount Cook (12,349) and Mount Tasman (11,475). The higher mountains are snow-covered throughout the year, and there are many beautiful glaciers. The Franz Josef Glacier descends to within 700 feet of

sea-level. The Southern Alps lie much nearer the west coast than the east; in the south-west the mountains approach the coast, and there is a stretch of magnificent fiord country: farther north the narrow coastal plain of Westland separates the mountains from the sea.

In the North Island, the main chain does not exceed 6,000 feet in height, and lies nearer the east coast. West of the main chain, three magnificent volcanoes tower to greater height, and a fourth,

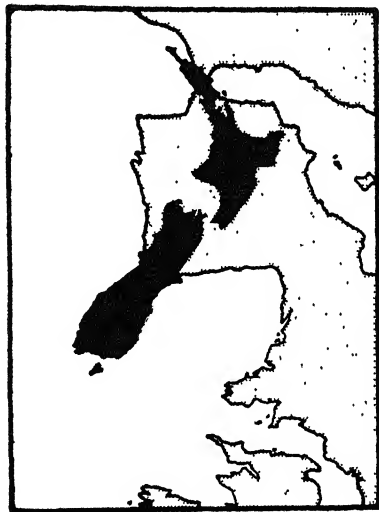


FIG. 178.—Sketch-map showing the position of New Zealand compared with land on the opposite side of the globe.

Mount Egmont, stands by itself in the south-west of the North Island and rises to 8,260 feet. Two have erupted in recent years.

On the basis of its physical features New Zealand may be divided into a number of broad physiographic regions:

THE NORTH ISLAND

(a) *The Eastern Mountain Ranges.* There is not one single range, but a series, and foothills occur all along the east coast except where interrupted by the broad Hawke's Bay.

(b) *The Volcanic Region.* This surrounds Lake Taupo and stretches northwards to the Bay of Plenty. To the south this region merges into the fertile

(c) *Wellington Plains.*

(d) *The Auckland Peninsula.*—This area occupies the north of the island, and is mainly lowland.

THE SOUTH ISLAND

(a) *The Southern Alps.* With their foothills and subsidiary ranges, these mountains occupy well over half the island. The main range of the Southern Alps stops abruptly at Cook Strait,

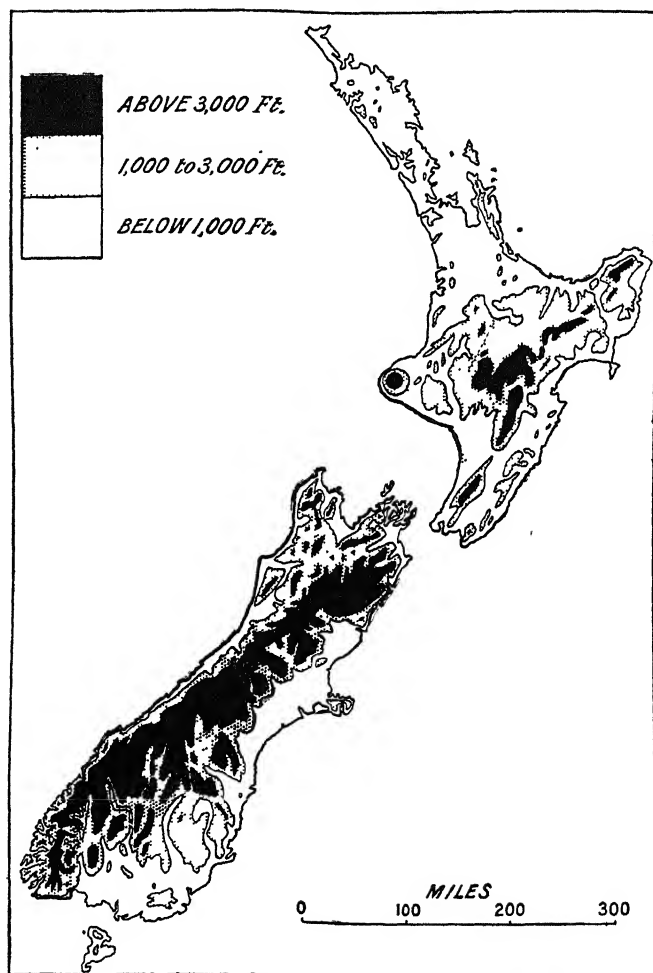


FIG. 179.—Physical map of New Zealand.

and is not continued into the North Island. It is a subsidiary eastern range to the Southern Alps which crosses the strait.

(b) *The Otago Plateau.* This large dissected plateau of ancient rocks occupies the south of the island.

(c) *The Canterbury Plains and Downland.* The Canterbury

Plains form a well-marked lowland region, 150 miles from north to south along the coast. With the plains may be included the hilly Banks Peninsula, largely of volcanic origin. Surrounding

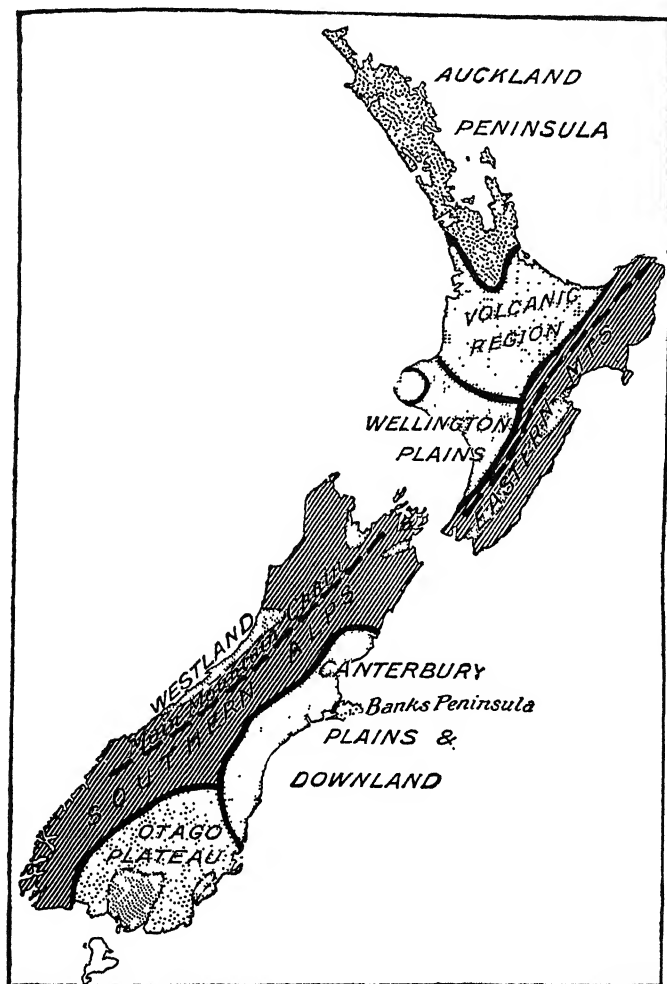


FIG. 180.—The main physical regions of New Zealand.

The more important plains which lie amongst the mountain or plateau lands are separately shown.

the plains and separating them from the Southern Alps are large stretches of undulating country or "downland."

The rivers of New Zealand, especially in the mountainous South Island, are swift streams more suitable for the generation of power than for navigation. In the South Island, the longer ones naturally

flow to the east coast. In the North Island the Waikato and certain others are navigable by small steamers but, like the Australian rivers, have sand-blocked mouths. Recent subsidence in the north of the island has resulted in the drowning of the river mouths, some of which afford excellent harbours.

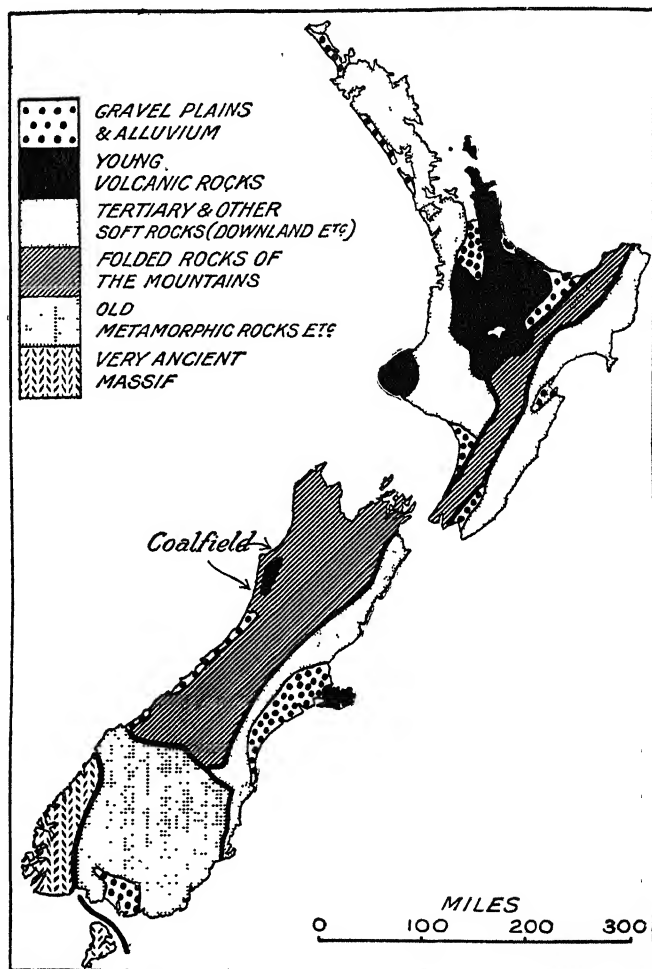


FIG. 181.—Simplified geological map of New Zealand.

Geology. Geologically the Dominion of New Zealand resembles England in containing small "samples" of rocks of most of the geological ages. Physical features depend to a marked degree on geological structure. In the South Island the Southern Alps consist

of highly folded rocks of varying age; the fiord country and Otago Plateau of ancient metamorphic rocks; the downland and low hills mainly of beds of soft sandstone and limestone; the larger plains, notably the Canterbury Plains, are of comparatively recent formation and consist of sheets of gravel—in some cases largely of glacial origin. In the North Island, the mountain ranges of old folded rocks are of more limited extent. Remnants of other fold ranges occur in North Auckland and the gold-bearing country of the Coromandel Peninsula. The dominant feature of the North Island is the volcanic country in the heart of the island and stretching northwards to the Bay of Plenty. Much of the surface is covered with pumice and is largely barren. East of the main fold ranges are younger rocks, and there are numerous though small gravel plains. Sand-dunes cover large areas near the west coast, especially in North Auckland.

Minerals. Although small quantities of many minerals occur widely scattered in New Zealand, only two or three are of commercial importance.

Gold. As in Australia, the discovery of gold in New Zealand contributed greatly to the progress and settlement of the country, but the production has been declining for a number of years. From 1853 to the end of 1953, gold to the value of £120,000,000 has been obtained. The production is mainly from lodes, as in the Cape Colville (or Coromandel) Peninsula, and from dredging operations in the beds of deep streams. Most of the gold from the quartz lodes contains a proportion of *silver*.

Coal. New Zealand has several small fields of bituminous coal, notably around Greymouth and Westport on the west coast, and some extensive fields of lignite. The present output of about 3,000,000 tons is not quite enough for home consumption.

Iron Ore. Extensive deposits of iron ore occur in Nelson Province and elsewhere, and a start has been made with smelting at Onakaka. Iron sands of many west coast beaches may one day be used.

Kauri-gum. The fossil gum is dug from the soils of former kauri forests in Auckland Province. To the end of 1953 the total value of the gum exported was £25,000,000.

Among other minerals may be mentioned New Zealand jade, phosphates, and sulphur.

Water-power. With a mountainous surface and a good and regular rainfall, and many rivers naturally regulated by lakes, New Zealand has exceptional resources of water-power. It is estimated that 1,000,000 H.P. could be easily developed in the North Island, and over 4,000,000 H.P. in the South Island. In 1951 over 850,000 H.P. was actually developed. The Lake Coleridge works supply Christchurch and Lyttelton; the Waikato River (with further works in progress) is used to supply Cambridge, Hamilton, and

district; and the Mangahoe and Waikaremoana Power Schemes supply Wellington and a large area. Large schemes using the Clutha River in South Island were carried out in 1949-50. The railways of the North Island are to be electrified.

Climate. Generally speaking, New Zealand has a mild and equable climate of the Cool Temperate Oceanic or North-West European type. See the graphs and figures for Dunedin, which may be considered typical of the colder parts, on p. 66 in Part I. The northern part of the North Island lies in the same latitudes as Mediterranean lands. It is too much influenced by the sea to have a typical Mediterranean climate, but there is a marked winter rainfall maximum, and a temperature ranging from 50° to 70° . Since the prevailing winds throughout New Zealand are from the west, the east is always the drier side—as shown in Figs. 182 and 183. The climate of the drier eastern coasts is more continental in character; at Christchurch the range of temperature is 20° ; frosts may occur for nine months, but summer temperatures of 90° F. are common. In most regions the climate is bright and sunny, and such situations as the shores of Tasman's Gulf enjoy a particularly sheltered and pleasant climate.

Natural Vegetation. New Zealand has a rich and varied vegetation. Temperate Forests, evergreen in the wetter regions and almost sub-tropical in character, form the typical vegetation of lowlands and lower slopes of the mountains. It is in these forests that are found the numerous ferns and tree ferns which have made the forest scenery of New Zealand world famous for its beauty. Mountain forests, consisting largely of the southern beech, may extend also to the lowlands. Grassland with tussocks of grass is common on the volcanic plateau of the North Island, and on the eastern plains of the South Island.

Forests. Over a quarter of New Zealand is forested, and State Forests cover 9,000,000 acres, or nearly 14 per cent. of the country. There is now very little of the famous kauri left; production of other native softwoods, such as rimu, kahikatea, and pine, is also declining. New Zealand is fortunate in having also hardwoods and there are large reserves of beech. There has been considerable Government afforestation; there is an export of softwoods from the plantations;

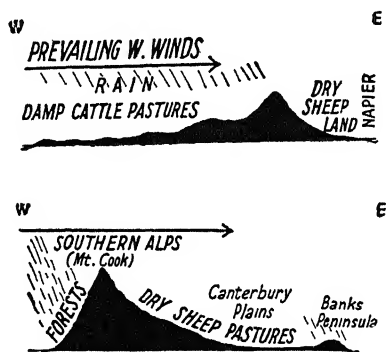


FIG. 182.—Sections across the North Island and South Island of New Zealand.

and the State has established a paper and pulp industry—especially for newsprint.

Agriculture. A quarter of New Zealand is forested; two-thirds is suitable for agriculture and grazing. Out of a total area of

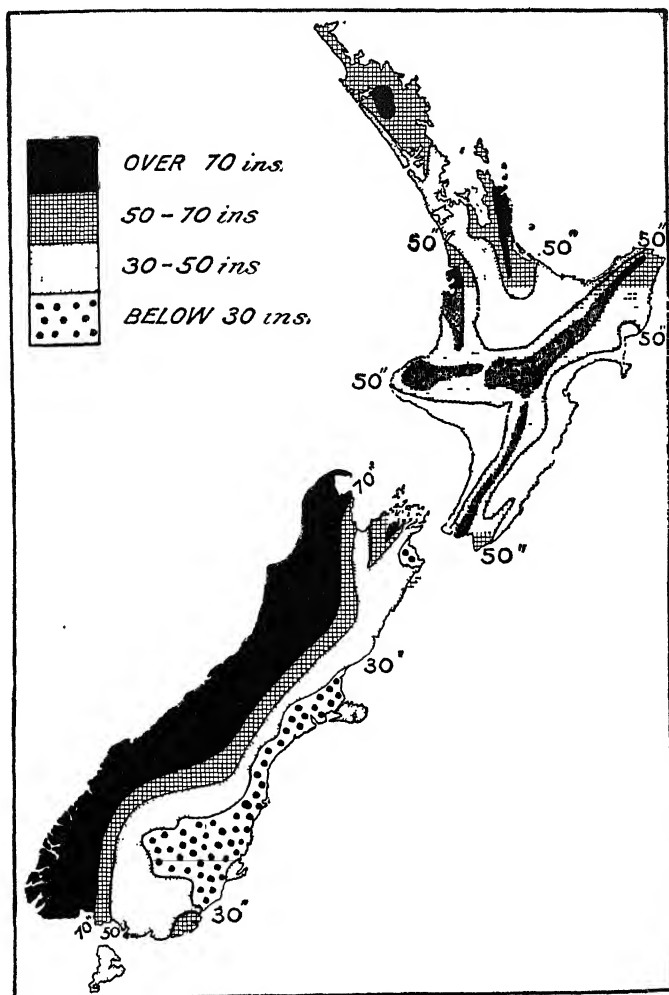


FIG. 183.—Rainfall map of New Zealand.

Notice that no part of the Dominion is really dry. Contrast Australia.

66,400,000 acres, 20,100,000 acres are under "cultivation" but no less than 18,000,000 acres of this are "sown grasses." The area under grain and pulse crops (excluding crops grown for hay) is less than 500,000 acres. It will be seen at once that New Zealand is a

pastoral rather than an agricultural country. Excluding hay, fodder, and turnips, wheat is the only crop covering more than 100,000 acres. Wheat is grown in the Canterbury Plains, oats in the Canterbury Plains, Otago, and the North Island. *Phormium tenax*, or New Zealand flax, a fibre largely used for rope-making, etc., is obtained from a plant growing wild in damp places, but also planted artificially, especially in Wellington Province. About 18,000 acres are occupied by *orchards*, especially in North Auckland, Nelson, Otago, Canterbury, and Hawke's Bay, and there is considerable export of apples. The vine will only grow in the warmer regions of the North Island. The large area under sown grasses is due to the fact that English grasses thrive, and afford better food for sheep and cattle than the native grasses. There is an important grass-seed industry with an export of seeds to other countries.

Pastoral Industries. The following table shows the number of animals in New Zealand in 1934, 1948, and 1953:

	1934	1948	1953
Horses	274,000	204,000	158,000
Cattle	4,301,000	4,716,000	5,450,000
Sheep	28,650,000	32,500,000	36,193,000
Pigs	660,000	548,000	628,000

Horses. Though still widely used for draught purposes and farm work, the number of horses has declined since 1911, largely owing to the increased use of motor-cars and mechanical farm implements.

Cattle. In the early days cattle were reared mainly for beef which was exported salted or, later, frozen. Then came a great development of dairying and dairy cattle, but successful experiments with the chilling of beef in 1933 led to a big increase in the export of chilled beef. In 1946-47 three-quarters of a million cattle and a million calves were slaughtered, yielding about a quarter of a million tons of meat. There is now a marked tendency amongst farmers to keep fewer but better cows, and to grow special fodder crops, so as to induce the cows to give more and better milk. Milking machines are widely used in New Zealand, and have effected a great saving in wages for the farmer. Amongst the New Zealand cattle are found all the best breeds of England, but the most numerous are cross-breeds in which the predominating strain is the famous Jersey breed. Under the Dairy Industry Act, 1908, the quality of dairy produce is carefully watched by inspectors appointed by the Government, with the result that New Zealand butter and cheese have acquired a high reputation in Europe. Fig. 184 shows the distribution of cattle in New Zealand. More than 80 per cent. of the whole is found in the moist, fertile lands of the North Island. Auckland specializes in the production of butter; Taranaki and Wellington in cheese.

Sheep. Owing to the varied nature of the surface, there are many different breeds of sheep, each requiring different conditions. Some

regions specialize, as in Australia, in producing fine quality wool; other regions in mutton and lamb for export. On the hills and downs of the South Island the merino sheep (famous for its wool) flourishes; on the Canterbury Plains the famous Corriedale breed of sheep (a cross between a merino and one of the English breeds, Leicester or Lincoln) produces the "Canterbury Lamb," well known in England, as well as excellent wool. In the moister North Island the Romney sheep, which comes from the wet Romney Marsh of England, is the favourite sheep. The Southdown sheep produces much of the fat lamb of both islands. The annual production of mutton and lamb is about 300,000 tons.

Other Farm Live-stock. Although there are large numbers of pigs in New Zealand, the pig-breeding industry has not progressed in the same way as the sheep-farming and cattle-farming industries. There are several million poultry. The dairying lands of the Dominion are well suited to bee-keeping, and honey of excellent quality is produced. Large quantities of honey are exported annually.

Fisheries. Increasing attention is being paid to the rich fishing grounds. The once-important whale fisheries revived after the Second World War as a result of the demand for whale oil and whalemeat.

Population. The colonization of New Zealand really dates from the foundation of Wellington in 1840. The gold rushes of the 'sixties brought large numbers of people to New Zealand, and since then there has been a steady increase both by immigration and by natural increase to 2,075,000 at the end of 1953. The native Maoris number about 125,000.

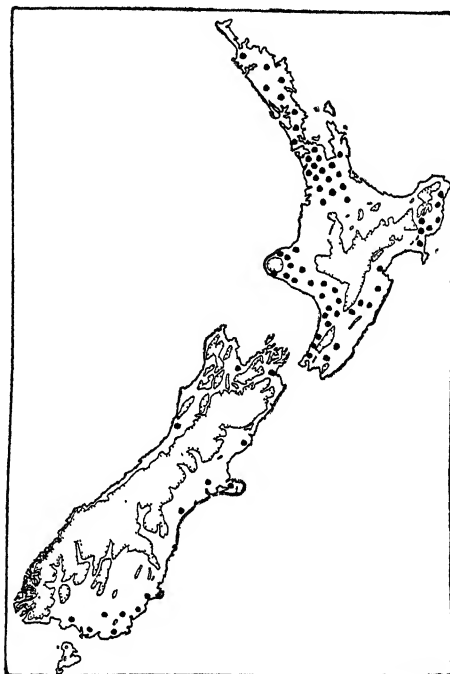


FIG. 184.—The distribution of cattle.

Each dot represents 50,000 cattle. All land above 2,000 feet shaded. The cattle are all on the lowlands. More should be shown round Mt. Egmont.

Manufactures. Although manufactures are still largely connected with the preparation of raw materials produced in the Dominion, there has been a remarkable development of heavy industries (using imported ferrous and non-ferrous raw materials) and light industries since about 1930. Industries based on home raw materials include meat-freezing and preserving; butter, cheese, and condensed milk making; grain milling, clothing manufacturing, and woollen-milling, saw-milling, brewing, and tanning. Steam as a motive power has largely been replaced by electricity.

Communications. The railways of New Zealand are now all state owned, and are on the 3 feet 6 inches gauge. As shown in Fig. 186, the direction of the railways has been controlled to a marked degree by physical features. The former isolation of such centres as Gisborne, Nelson, and Blenheim (now well served by road) should be noted, and it will be gathered that coastal steamer services play a large part in the communication system. Great progress has been made in the improvement of roads in New Zealand since the widespread use of motor-cars.

Despite its world-isolation, New Zealand is becoming an important tourist centre. The variety and accessibility of its scenic attractions and its thermal waters are mainly responsible.

Foreign Trade. New Zealand enjoys the distinction of having a larger foreign trade per head of population than any other country in the world.

Fig. 187 shows the leading items in the export trade. It will be seen that the wealth of New Zealand depends almost entirely on her dairying and sheep-farming industries. In 1953 the proportions by

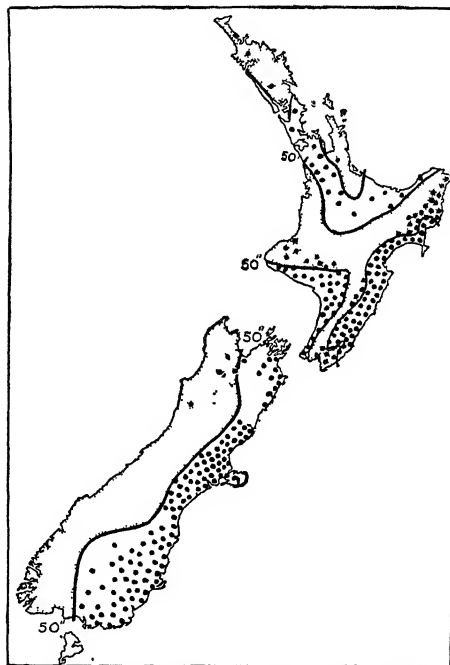


FIG. 185.—The distribution of sheep in New Zealand.

Each dot represents 100,000 sheep. The line shown is the 50-inch rainfall line. Notice that nearly all the sheep are found where the rainfall is less than 50 inches per year.

value were: wool, 36 per cent.; butter, 22 per cent.; meat, 19 per cent.; cheese, 8 per cent. Other items of importance are sheepskins and hides, 4.6 per cent.; tallow, 0.8 per cent.; preserved milk, 2.7 per cent.; seeds, 0.9 per cent.; all connected with the pastoral

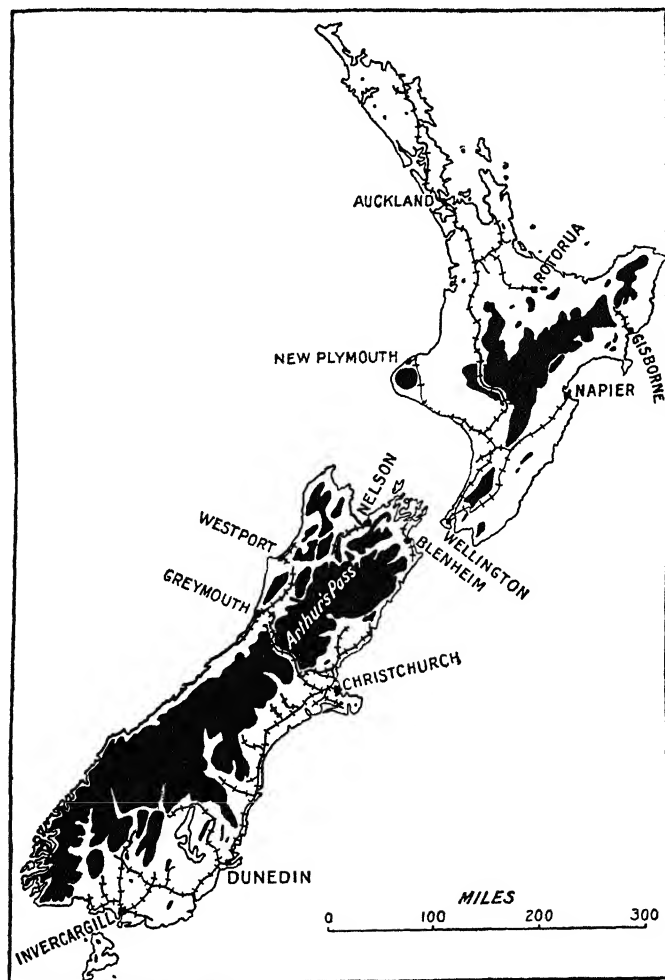


FIG. 186.—The railways of New Zealand.

All land over 2,000 feet in black. Only two railways cross this high land.

industries. Gold represented in 1947, 0.2 per cent.; timber, 0.3 per cent.; phormium fibre, 0.1 per cent.; kauri gum, 0.1 per cent.

In normal years the value of imports is considerably less than that of exports (per head of population).

As shown in Fig. 188, the imports are far more varied than the exports, but manufactured goods easily predominate.

Direction of Trade. Taking the average of the years 1950-55, about 70 per cent. of the exports went to the United Kingdom; and more than 50 per cent. of the imports were received therefrom.

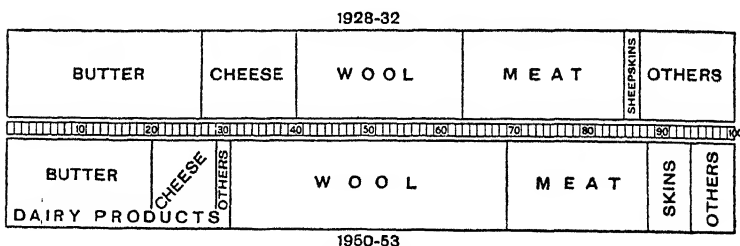


FIG. 187.—The exports of New Zealand.

The diagram stresses the dependence of New Zealand's prosperity on sheep and dairy-farming

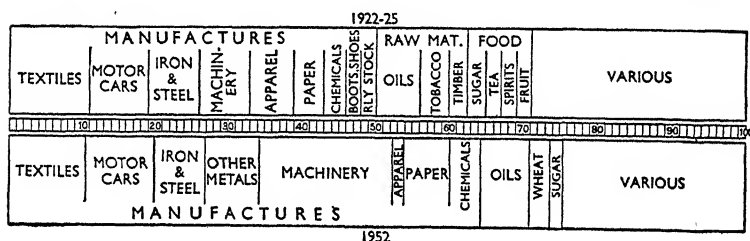


FIG. 188.—The imports of New Zealand.

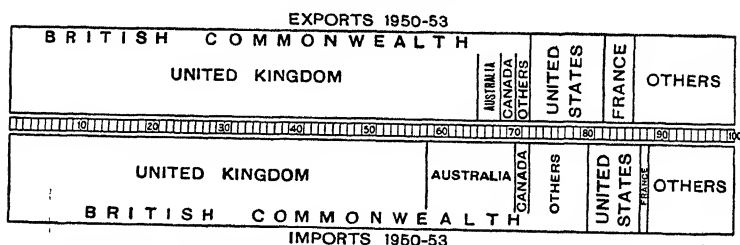


Fig. 188a.—The direction of the foreign trade of New Zealand.

The United States took about 8 per cent. of the exports and supplied 8 per cent. of the imports; Australia took 3 per cent. of the exports and supplied about 15 per cent. of the imports. The remarkably close trade connection between New Zealand and the Mother Country is particularly noteworthy. Over 90 per cent. of the traffic is carried in British ships.

Ports. The leading ports of New Zealand are Auckland and Wellington, close rivals in the import trade and receiving over 60 per cent. of the whole. Other importing centres in order are: Lyttleton, Dunedin, New Plymouth, The Bluff (Invercargill), and Napier.

The export trade is more evenly distributed, though more than 40 per cent. is handled by Wellington and Auckland. The others in order are: Lyttelton, Napier, The Bluff, New Plymouth, Timaru, and Dunedin.

THE NATURAL REGIONS OF NEW ZEALAND

The division of New Zealand into provinces was largely the result of the early days when separate parliaments governed in their own little spheres. A region clearly marked off by nature became a distinct unit politically. There was, therefore, a fairly close correlation in New Zealand between the natural regions and the provinces. In many cases the divisions between provinces were also the divisions between natural regions. Though provincial divisions are no longer used officially, but have been replaced by counties, the old names are still widely used.

THE NORTH ISLAND

North Auckland, including the Auckland Peninsula. The province of Auckland was the largest and most northerly in New Zealand, and covered nearly a quarter of the whole of the Dominion. It corresponds roughly with the climatic region which has a modified Mediterranean type of climate with a winter rainfall maximum. The northern warmer region corresponds roughly with the Auckland Peninsula, but includes also a very important tract of lowland south of the city of Auckland.

North Auckland is the home of the giant kauri, one of the finest timbers in the world, and once highly esteemed by reason of the magnificent masts for sailing ships which it made. The kauri exudes a clear gummy fluid, which hardens as it dries and drops off the trees into the soil. "Kauri-gum" is thus obtained by digging not only in the soil of the existing forests but in many regions where the kauri formerly existed. It is also possible to obtain supplies by regular tapping of growing trees. Its value lies in its use in varnish making. Although large areas of kauri forest are now rare, there are many other fine forests left, and timber milling is an important industry.

The absence of frosts allows the growth of such Mediterranean trees as the orange, lemon, olive, and vine; whilst deciduous fruits (apples and pears) flourish. But Auckland is pre-eminently a dairying province, and dairying is the leading industry.

We may include in the natural region now under discussion (though it lies outside North Auckland) the hilly peninsula known as the Cape Colville or Coromandel Peninsula. This is the great gold-mining area of New Zealand, and has yielded half the gold found in the Dominion. Agriculture is here making rapid strides.

Auckland (population 350,500 in 1953), the largest city in New

Zealand, is situated on the fine Waitemata Harbour, where the isthmus is only about half a dozen miles wide. It has the advantage of a second but much shallower harbour at Onehunga, on the southern (or south-western) side of the isthmus. Auckland is

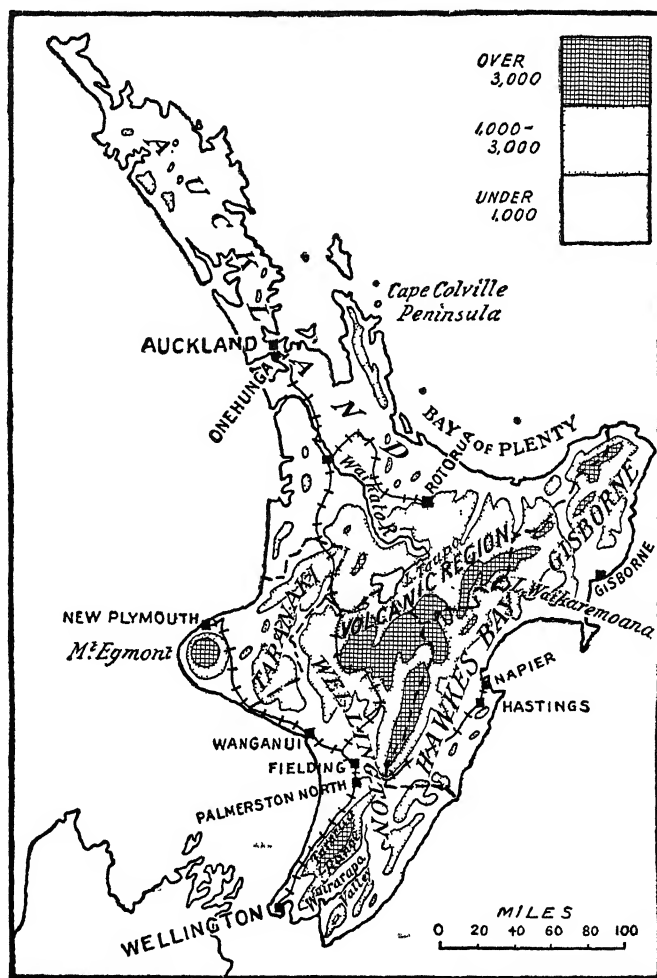


FIG. 189.—The North Island.

The divisions are the old provinces.

connected by rail with Wellington, 426 miles away, as well as with the northern part of the peninsula. Situated as it is towards the northern end of New Zealand, Auckland is nearer the great ports of North America, San Francisco and Vancouver than are the other ports of New Zealand. This is one reason why it is a popular port of

call for liners between Australia and America. *Hamilton* (35,500 in 1953) lies south of Auckland at the head of navigation of the Waikato River. It is the business centre of a prosperous agricultural and dairying country.

The Volcanic Region of the North Island. Forming roughly the centre of the volcanic region is Lake Taupo. To the north is Rotorua, the centre of New Zealand's geyserland and a well-known health resort and spa. To the south of the region are the volcanic giants Ruapehu, Ngauruhoe, and Tongariro. The western part of the volcanic region is sometimes called by New Zealanders the "Main Trunk District." Through it passes the main trunk railway from Auckland to Wellington, and the area is a great stretch of fine forest country, for long the domain of a warlike Maori chief.

Taranaki and the Western Portion of Wellington. The lowlands of the south-western part of the North Island are very fertile and important. The old province of Taranaki is a land of dairy farms, many of them under the shadow of the beautiful snow-capped volcano, Mount Egmont. There are many up-to-date dairy factories, and the further development of hydro-electric power will continue to improve the quantity and quality of the output of milk, butter, and cheese.

New Plymouth (26,600 in 1953) is the chief town and port of this great dairying region, and has an artificial harbour, though partly protected by natural features. The old province of Wellington is one of the most productive in the Dominion, and west of the mountain divide dairying is the leading occupation; there is also a varied agriculture, and the region leads in the production of New Zealand flax. Great flax swamps are passed by the railway going northwards from Wellington. Palmerston North (35,000), Fielding, and Wanganui (31,200) are the centres for the region. *Wellington* (217,800 in 1953), the capital of New Zealand, is well situated on the large deep harbour of Port Nicholson. Notice the fine central position of Wellington and its ability to serve as the outlet for both east and west coasts.

The East Coast. The east coast corresponds exactly with the old land district of Hawke's Bay and that part of Wellington lying east of the Tararua Range. We have already learnt that the east side is the dry side of New Zealand and, as we should expect, the great sheep-farming centre of the Dominion. This is true of Hawke's Bay as well as of many parts of eastern Wellington. In the rich Wairarapa Valley of Wellington and the plain of south-western Hawke's Bay dairying is rapidly increasing in importance. Apples, pears, and peaches grow well, while the sunny climate and sheltered position make vine-growing and wine-making possible.

Napier (26,100 in 1953) is the principal town and port. *Hastings* 25,300 is a growing centre fourteen miles to the south. Electric,

power for the whole of the east coast has been provided by the works utilizing the outfall from Lake Waikaremoana. *Gisborne* (21,100 in 1953) is the centre of the northern part of the east coast.

THE SOUTH ISLAND

The West Coast.—Lying between the crest of the Southern Alps and the sea is the province of Westland. In the middle of the west coast there is a narrow coastal plain, but southwards the mountains come right to the coast, and one passes into the beautiful fjord country of Southland. The northern part of the west coast lies in the province of Nelson, but the fertile sheltered part of this province lies round the shores of Tasman Bay. The west-coast region as a whole is a very wet one; all parts have upwards of 75 inches of rain. The lower slopes of the mountains—most of the province of Westland—are forested and sparsely populated, whilst the higher parts of the mountains and the fjord country may be described as uninhabited. The scenery of much of the coast and mountains is very fine; the Franz Josef and Fox Glaciers descend to within 700 feet of sea-level. *Hokitika* is the starting-point for tourists visiting the glaciers. Although dairying is being developed, the chief importance of the west coast lies in its mineral resources. The two leading coalfields are round the coal-ports of Greymouth and Westport. In the 'sixties of last century "gold rushes" to the rich alluvial goldfields were the means of settling the country, and a little gold is still obtained, especially near Reefton. The piercing of the Southern Alps by the Arthur's Pass tunnel (the longest tunnel in the British Commonwealth) has placed the west-coast coalfields in direct touch with the Canterbury Plains, and should do much to develop the country.

Marlborough and Tasman Bay. The north end of the South Island is cut off by mountain ranges from the west coast and from the Canterbury Plains, and can be considered as forming a distinct region. The provinces as a whole are hilly and the small areas of good, flat land have become the centres of development. In Nelson, around the mild and sunny shores of Tasman Bay, a busy fruit-growing area has developed. *Nelson* (18,600 in 1949) is the centre of the industry, and an export trade in apples and pears (sent to England and South America) is firmly established. Hops grow well in the same region. Cement is manufactured at Golden Bay. In Marlborough the climate is drier, but the plains are more extensive. The Wairau Plain was an early area of settlement, and grows excellent barley, as well as seed peas for distribution through the Dominion. The hills of Marlborough Province support large numbers of sheep. *Blenheim*, the business centre, is four hours by steamer from Wellington across the Cook Strait.

The Canterbury Plains and Downs. The Canterbury Province is one well marked off by nature and really consists of four parts:

(a) The slopes and spurs of the Southern Alps with their beautiful glacial lakes.

(b) A belt of undulating country—the “Downs” between the mountains and the plain. This downland approaches close to the coast at both the northern and southern ends of the province.

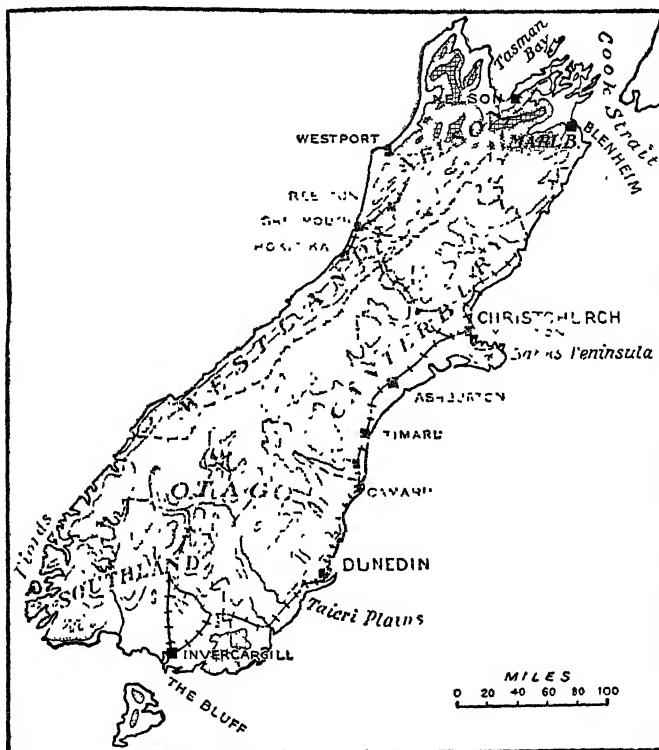


FIG. 190.—The South Island.

The old provinces are now “provincial districts.” For key to shading see Fig. 189.

(c) The Canterbury Plains, a broad, gently undulating, gravel plain, occupying the centre of the east coast.

(d) The hilly Banks Peninsula, attracting a heavier rainfall than that found on the Canterbury Plains.

The provincial district lies on the lee side of the Southern Alps, and so is the driest province in New Zealand. Nearly all the plainland receives less than 25 inches of rain a year. The Canterbury Plains may be described as the chief grain-growing district of

the Dominion, The leading cereal is wheat, and average yields are high. Other crops are clover, peas, and grasses—often grown for seed purposes. Generally speaking, the hill country is utilized for sheep-raising, but large numbers of sheep are sent annually to the rich Canterbury Plains for fattening. Hence, the high quality of mutton from the region. Dairying is being developed and fruits grow well.

Christchurch (182,800 in 1953), with its port *Lyttelton*, is the centre of this rich region. *Lyttelton* is reached by a daily service of fast steamers from *Wellington*, and from *Lyttelton* and *Christchurch* there is railway communication as far as *Invercargill* in the extreme south and *Picton* in the north.

Ashburton, *Timaru* (24,000), and *Oamaru* are prosperous centres of the plains.

Otago and Southland. Otago consists mainly of a plateau of ancient rocks, deeply cut into by valleys largely of glacial origin. The plateau is continued into Southland and on the west coast includes the beautiful fjord country. On the south-east coast there are several fertile plains, in which the population is concentrated. It was the discovery of gold which first attracted settlers to Otago—in the 'sixties of last century—and *Dunedin* (97,900 in 1953) for a time became the commercial centre of New Zealand. The prosperity of the region now depends mainly on sheep-rearing and agriculture. The hill country affords pasturage to large numbers of sheep, whilst the fertile plains are being given over more and more to agriculture. The Taieri plains, south of *Dunedin*, and the plains of Southland grow oats; barley grows well round the beautiful inland lakes, which incidentally attract numerous tourists. Central Otago is celebrated for its fine fruit; some parts are sufficiently dry to need irrigation. *Invercargill* (32,700 in 1953) is the leading town of Southland, and is separated by a few miles from its port, known as *The Bluff*.

DEPENDENCIES OF NEW ZEALAND

The Cook Islands. The Cook Islands were attached to the government of New Zealand in 1901. There are twelve inhabited islands (including *Niue*) with a total population of 20,000. Of these 4,600 are in *Niue* and 6,000 in *Rarotonga*. Wireless stations are now established on four of the islands. The leading exports are copra, oranges, bananas, tomatoes, and other fruits.

The Union (Tokelau) Group of islands is also administered by New Zealand. The islands are inhabited by about two thousand natives, and produce copra.

Western Samoa. The former German islands of Western Samoa are administered by New Zealand as trustee for the United Nations.

They lie in tropical waters 1,700 miles north-east of New Zealand. There are two main islands, Upolu (430 square miles) and Savaii (703 square miles). Upolu is covered with luxuriant tropical vegetation; it abounds in fertile valleys with swift mountain streams.

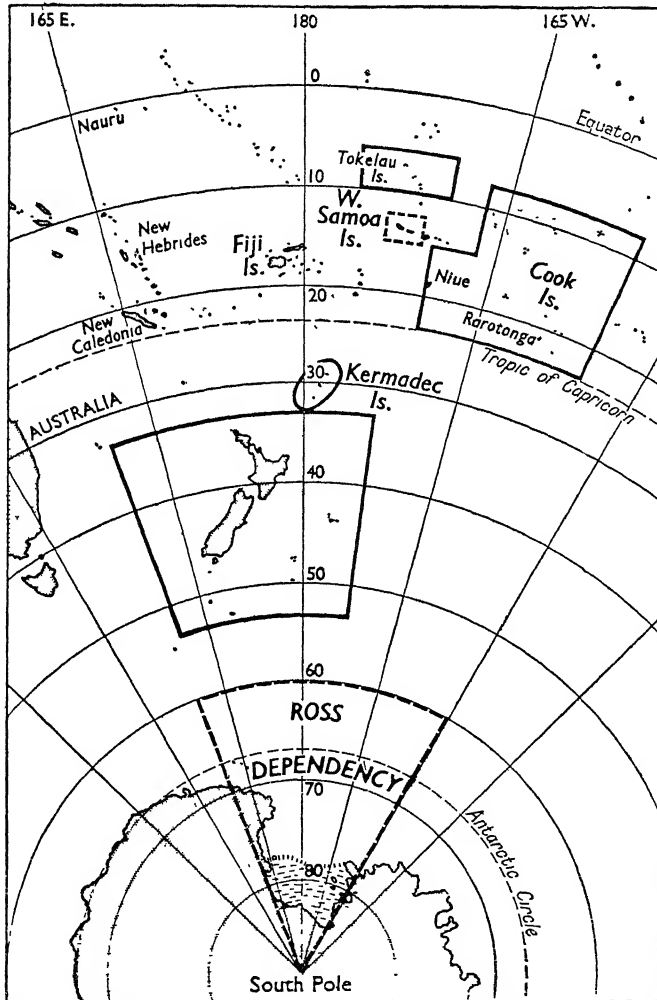


FIG. 191.—The Dominion of New Zealand and its Dependencies.

There are now extensive plantations of coconuts and cacao. There are 90,000 inhabitants in the islands, including 300 Europeans. Apia is the capital and chief port; copra and cacao beans are the only exports of importance. The island of Savaii, though larger, is very mountainous (rising to 4,000 feet) and is less productive.

OTHER PACIFIC ISLANDS

The Fiji Islands belong to the British Commonwealth, and lie on the trade routes between Australia and New Zealand on the one side, and Canada and the United States on the other.

Nauru. Nauru, or Pleasant Island, lies nearly on the equator. Before the First World War it was a German possession. Now it is a United Nations Trustee Territory with the United Kingdom, Australia, and New Zealand as joint administering authorities though

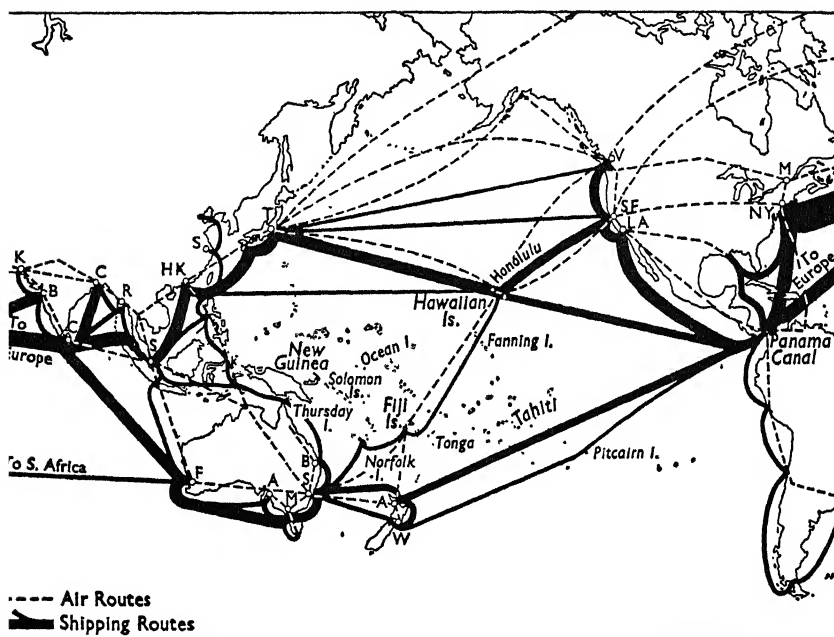


FIG. 192.—Trade routes of the Pacific Ocean.

by mutual consent Australia actually appoints the Administrator. It is of considerable importance, owing to the rich deposits of phosphate. Over a million tons a year of phosphate is exported from Nauru and a further 250,000 tons from Ocean Island, mainly to Australia, New Zealand, and Japan.¹ The deposits in the two islands are estimated at 100 million tons. The yearly production of phosphate is divided between the governments of Great Britain, Australia, and New Zealand in the proportion of 42, 42, and 16. It is of great importance to Australian agriculture.

¹ Ocean Island forms part of the Gilbert and Ellice Islands Colony.

The Tonga or Friendly Islands form an Independent Polynesian Kingdom under the protection of Great Britain.

New Caledonia is a French possession, formerly used as a convict settlement. It has large deposits of nickel ore.

The Hawaiian Islands belong to the United States. The principal town, Honolulu, is now a large city, and an important port of call for ocean and air liners crossing the Pacific. The islands are famous for their pineapple plantations; the tinning and export of pineapples is now a large industry. There is a famous active volcano, Mauna Loa, on one of the islands, and on its flanks is a subsidiary volcano (Kilauea), of which the crater is occupied by a lake of molten lava which can actually be visited and studied.

Other Islands. Some of the tiny islands of the Pacific are used as "signal stations." They are equipped with wireless apparatus and pass on messages received from ships. Examples of islands used for this purpose are Thursday Island, Norfolk Island, Fanning Island (also cable stations), and Ocean Island.

NEW GUINEA

The island of New Guinea is sometimes described as the largest in the world. It is nearly 1,500 miles long, and has an area of about 300,000 square miles. It is situated in the region of equatorial climate, and the lowlands are covered with hot, wet, evergreen forests. The interior is occupied by a very lofty plateau, said to be covered with dense tropical grassland. The western part of the island is Dutch territory; the south-east, under the title of Papua, is administered by Australia; whilst the north-east, now known as the Territory of New Guinea, was formerly a German possession, and is now administered by the Australian Commonwealth as a United Nations Trustee.

Many of the inhabitants of New Guinea are wild, cannibal tribes, and the interior of it is still little known. The white population is slowly increasing, and both in Papua and New Guinea plantations are extending, especially those of coconuts and rubber. Minerals, including gold and oil, are believed to exist in payable quantities. Included in the trustee territory are the Bismarck Archipelago and those Solomon Islands which lie outside the British Solomon Islands Protectorate.

ANTARCTICA

The barren Antarctic continent consists probably of a high plateau of land, but for the most part is covered by a great depth of ice and snow. Under the name of the Ross Dependency a large sector has been placed under the government of New Zealand. The whale-fishing industry is one of great value in the territorial waters,

and is being exploited mainly by Norwegians under licence from the New Zealand Government

EXERCISES

1. The Foreign Trade of the Commonwealth of Australia should be kept up to date from the *Statesman's Year Book*.
2. Other statements and figures in the section on Australia may be checked from the *Official Year Book of the Commonwealth of Australia*.
3. The Foreign Trade of New Zealand. Keep up to date from the *Statesman's Year Book* or the *New Zealand Official Year Book*.

EXAMINATION QUESTIONS

1. Compare and contrast the sheep-rearing industry of Australia with that of New Zealand.
2. Compare and contrast railway development and railway communications in North America and Australia.
3. Suggest a scheme of railway development for Australia.
4. Describe and account for the arrangement of vegetation zones around the arid interior of Australia.
5. How far may the Murray-Darling lowlands be said to constitute a single Natural Region?
6. Outline the outstanding geographic factors which have determined Australia's economic development.
7. *Either*, Compare the physical character and economic development of the lowland regions in the two main islands of New Zealand.
Or, Discuss the geographical factors affecting the distribution of (a) sheep in South, and (b) cattle in North Island, N.Z.
8. Compare the climates of the North and South Islands of New Zealand. To what extent does the climate of the North Island conform to the Mediterranean type?
9. Trace the effect of the configuration of *either* the South Island of New Zealand, *or* Eastern Australia upon the distribution of population and the position and growth of towns.
10. Discuss on a geographical basis the problem of the peopling of tropical Australia.
11. Discuss the population problem in either Australia or the Argentine as regards distribution, immigration, and racial elements.
12. What is an artesian basin? Discuss the rôle of artesian basins in the present and the future development of Australia.
13. Discuss the factors that are likely to help and to hinder the closer settlement of Australia.
14. Write a short geographical account of *either* South Island, New Zealand *or* Nova Scotia.
15. What geographical factors favour the development of manufacturing industries in S.E. Australia?
16. Discuss the geographical facts that underlie the following figures of distribution of population: Queensland (1921), 1.1 per sq. mile; New South Wales (1921), 6.8 per sq. mile; Kiangsu Province (mouth of Yangtze Kiang), 4,000 per sq. mile.
17. Compare and contrast Tasmania and the South Island of New Zealand as regards climate and agriculture.
18. New Zealand is said to be far more like Britain than is Australia, and therefore to be more easily settled by British emigrants. Comment on this statement.
19. Give an account *either* of the Northern Territory of Australia, *or* of the economic development of the interior of Queensland.
20. Compare the effectiveness of rail and boat communications between Australia's capital cities.

21. Describe *either* (a) the gradations of climate along the coast of Queensland from Cape York to Brisbane, *or* (b) the Murray-Darling basin with special reference to its climates and their bearing upon economic development, *or* (c) Northern Australia with special reference to its climate.

22. Give some account of *either* (a) the indigenous forms of plant life, *or* (b) the indigenous animal life of Australia.

23. Give some account *either* (a) of the distribution and the varied forms of stock-raising practised in Australia, *or* (b) of the production of fruit and wine for commercial purposes in Australia.

24. Compare the Eastern Highlands of Australia with the Cordillera of South America.

25. Compare the climates of Ceylon and South Island, New Zealand.

26. Give a reasoned account of the present distribution in Australia of the chief areas devoted to *either* (i) sheep, (ii) dairy cattle, *or* (i) fruit, (ii) wheat.

27. Write a brief geographical description of the State of Victoria.

28. How far is it true to say that "remoteness" has always been an obstacle to rapid development of population in Australia?

29. Give reasons for the fact that Queensland is the only Australian state in which the value of its trade with the other states of the Commonwealth is greater than that of its overseas trade.

CHAPTER V

ASIA

GENERAL CONSIDERATIONS

Position and Size. Asia is the largest of all the continents and comprises nearly one-third of the land of the globe. With the exception of some of the islands of the East Indies, it is situated entirely in the Northern Hemisphere. It stretches from the frozen shores of the Arctic Ocean, far inside the Arctic Circle, into the Tropics, and the southernmost part of the mainland near Singapore

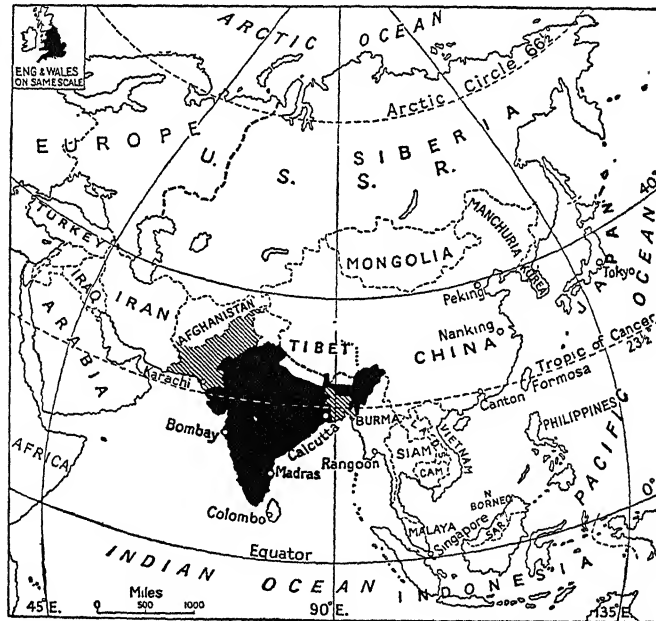


FIG. 193.—The position and size of Asia.

The approximate latitudes of the towns marked should be noted.

nearly reaches the equator. From west to east it stretches from 25° E. to 170° E.—around more than one-third of the Earth's circumference. Some parts of Central Asia are more than 1,500 miles from the sea. The positions of the Arctic Circle (66½° N.) and the Tropic of Cancer should be carefully noted and also the central meridian, 90° E. In particular the situation of India and China

in relation to these lines and the latitude of Japan when compared with the British Isles and the New England States should be noticed.

Physical Features. The great continent of Asia can be divided, according to its structure or physical features, into four parts. This division has been made in Fig. 194.

1. *The Northern Lowlands*, forming a great triangle of low land bordered on the north by the Arctic Ocean. This great area of lowland, comprising most of Siberia, is only separated from the Great European Plain by the low range of the Ural Mountains.

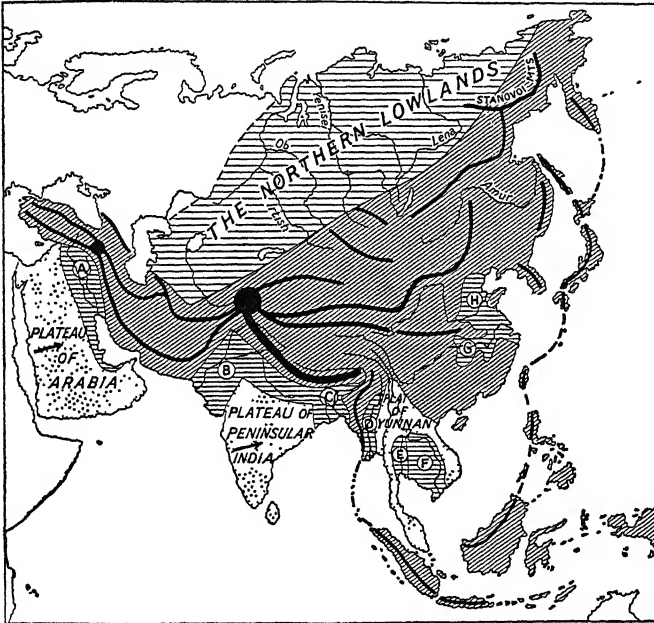


FIG. 194.—The main physical features of Asia.

For key to letters see text.

2. *The Central Triangle of Young Folded Mountains* and the plateaus which they enclose. This is a great area of highlands and mountains forming a triangle in the centre of Asia. There is a big extension from the triangle running westwards and ending in Asia Minor, and there are other extensions—lines of folded mountains running away to the south-east and forming some of the ranges of Indo-China and the East Indies.

3. *The Old Plateaus of the South*, formed mainly of old, hard, crystalline rocks. There are three big masses: (a) the Plateau of Arabia; (b) the Plateau of Peninsular India; and (c) the Plateau of Yunnan and Indo-China.

4. *The Great River Valleys*, found between the old plateaus and the fold mountains. These are the basins of the Tigris and Euphrates, the Indus, the Ganges-Brahmaputra, Irrawaddy, etc. Each of these physical divisions may now be considered in order.

1. *The Northern Lowlands*. This great plain is formed of the basins of the Ob, Yenisei, and Lena. In the south-west is a small area of inland drainage, draining into the Sea of Aral. The three great rivers are very long and very slow, for the slope down to the Arctic Ocean is very gradual. The rivers flow towards the very cold north, and their lower courses are frozen for many months of the year. When this happens the water from the upper courses cannot escape to the sea, but spreads over the land and forms great swamps.

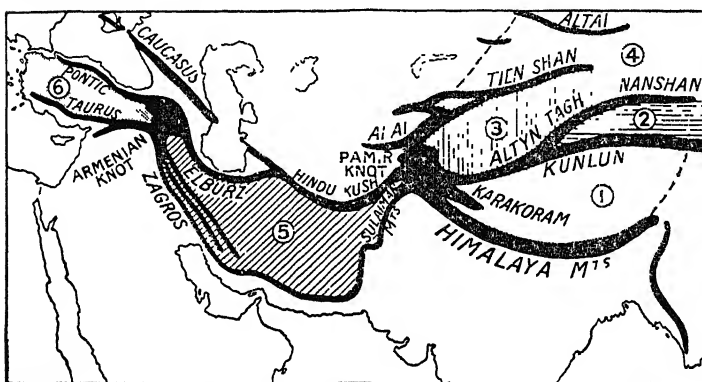


FIG. 195.—Key to the mountain ranges shown in Fig. 194.

2. *The Central Mountainous Triangle*. To understand the numerous mountain ranges let us start from the Pamir Knot. They are shown, very much simplified, in Fig. 195. From this region mountain ranges radiate in nearly all directions.

To the west there are two main ranges. One runs south-west as the Sulaiman Mountains, continued beyond the Bolan Pass as the Kirithar Range, and then along the coast of the Persian Gulf (Makran Coast), continuing as the Kirdistan scarp into Asia Minor, where it joins up with the northern branch to form the Armenian Knot. Thence it runs along the southern coast of Asia Minor as the Taurus Mountains. The other branch runs westwards as the Hindu Kush, along the north of Persia, the shores of the Caspian Sea (Elburz Mountains), and along the northern coast of Asia Minor. Just where this line enters Asia Minor it joins up, as already noted, with the southern branch to form the Armenian Knot. A branch from this northern line forms the Caucasus Mountains.

Running eastwards from the Pamir Knot there are four main lines. The most southerly is the greatest range in the world—the Himalayas. Farther north are the two ranges, close together, of the Kunlun and Altyn Mountains. Still farther north are the Tien Shan Mountains. This last forms one of several ranges and chains of mountains, such as the Altai, which run roughly from east to west and together make up a composite line extending north-eastwards from the Pamir Knot right across Asia.

There remain for consideration two other groups of young fold mountains:

(a) Running at first south-westwards and then southwards from the eastern end of the Himalayas is a big fold which passes through Burma as the Arakan Yomas, continues through the Andaman and Nicobar Islands to Sumatra and Java and other islands of the East Indies.

(b) Forming “festoons” or loops down the east coast of Asia are the mountain chains which form the Kurile Islands, the Japanese Islands, the Riu Kiu Islands, the Philippines, etc. On the mainland are other mountain loops such as the Stanovoi and Verkhoyansk ranges.

Between the great lines of fold mountains are the plateaus; many of them are nearly level plains surrounded by the ring of mountains and forming areas of inland drainage. They are marked by the following numbers on Fig. 195:

1. The plateau of Tibet, or the “Roof of the World,” is the highest plateau in the world—more than 12,000 feet above sea-level. It lies between the Himalaya Mountains on the south and the Kunlun on the north.

2. There is a small basin slightly lower, between the Kunlun and Altyn ranges. It is largely occupied by a swamp.

3. The Tarim Basin is an important area lying between the Altyn Mountains and the Tien Shan. It is a dry region; what water there is drains inwards into a small lake.

4. The Desert of Gobi, or Shamo, forms an enormous plateau south of the Altai and Yablonoi Mountains and north-east of the Altyn Mountains.

5. The plateau of Iran, occupying most of Persia, lies between the northern and southern ranges which run westwards from the Pamir Knot.

6. The plateau of Asia Minor west of the Armenian Knot, between the Black Sea and the Mediterranean.

The position of these plateaus is most easily remembered in connection with the mountain ranges by which they are enclosed.

The important rivers draining eastwards from the mountain triangle to the Pacific Ocean should be noted. The largest are the Amur, Hwang Ho, Yangtze.

3. *The Old Plateaus of the South.* Arabia is a great plateau of old, hard rocks, which shows a steep edge to the Red Sea on the west and slopes gradually to the east till it passes into the Tigris Valley. The slope is very gradual and not much broken up, for the country is dry and there are few rivers.

(a) The plateau of Peninsular India also slopes from west to east. The steep western edge forms the Western Ghats, the low eastern edge the Eastern Ghats. This plateau is much cut up by rivers like the Mahanadi and Godavari.

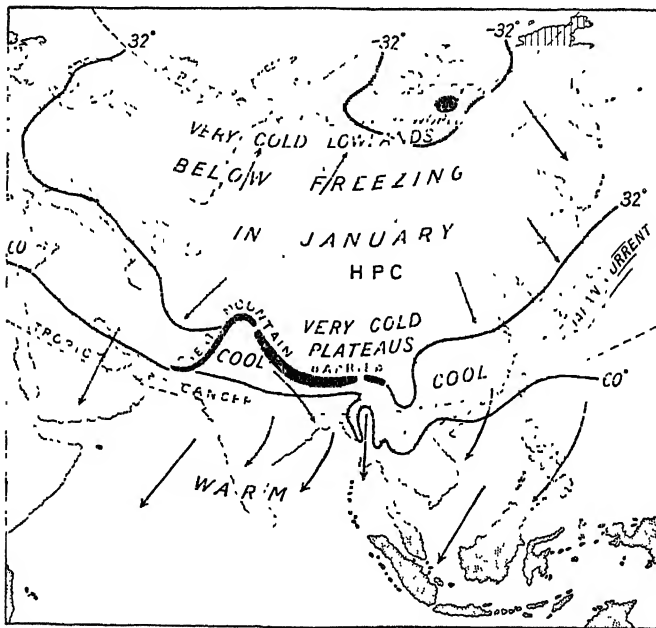


FIG. 196.—Conditions in the cold season showing January temperatures and winds.

Notice that the whole of Asia north of the great Himalayan mountain barrier is freezing in January. Notice the cold, dry winds blowing outwards from Central Asia; they make China and Persia cold, but are little felt in India. The warm Japan current keeps Japan warm.

(b) The plateau of Yunnan and Indo-China stretches from the Shan States in Burma eastwards. A long branch of old rocks runs down into the Malay Peninsula. This plateau is also much broken up by rivers, such as the Salween, Mekong, and the upper course of the Yangtze.

4. *The Great River Valleys.* These are fertile areas of lowland with vast stretches of alluvial soil. Note their position on the map (Fig. 194)—the Tigris and Euphrates Basin (A), the Indus Basin (B), the Ganges-Brahmaputra Basin (C), the Irrawaddy Basin (D), the Menam Basin (E), the Mekong Basin (F), the Yangtze Basin (G), and the Hwango Ho Basin (H).

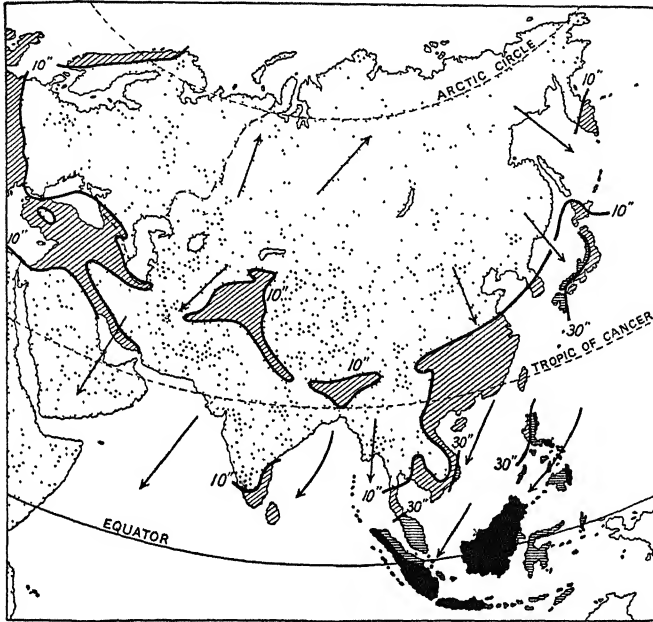


FIG. 197.—Conditions in the cold season—rainfall from November 1 to April 30.

The cold winds bring very little rain except after they have crossed the sea. The rainfall lines marked are 10, 30, and 60 inches. Regions with more than 60 inches shown in black.

Climate. In considering the climate of North America it was noted that two physical factors were of paramount importance in determining the climates of the continent. The same is true of Asia, but the conditions are the reverse of those found in North America. In the first place there is a great mountain barrier—the Himalayas—running from east to west which cuts off the south of the continent completely from the north. In the second place the centre of Asia is occupied by a great mass of mountains and highland, far removed from the sea, and is therefore subject to great extremes of temperature.

Winter conditions are illustrated in Fig. 196. The centre and north become very cold indeed, so that there is an enormous mass of cold air all over the centre of Asia. This gives rise to a region

of high pressure with strong, cold, outblowing winds during the winter months. The winds are dry because they are land winds; the only regions where they become damp are where they cross some area of sea. As shown in Fig. 197, nearly the whole of Asia receives very little rain in winter. The exceptions—notably the north coasts of Japan and the East Indies—should be noted. It is particularly during winter that the Himalaya Mountains form a great climatic barrier and prevent India from feeling the cold winds from Central Asia such as sweep over China.

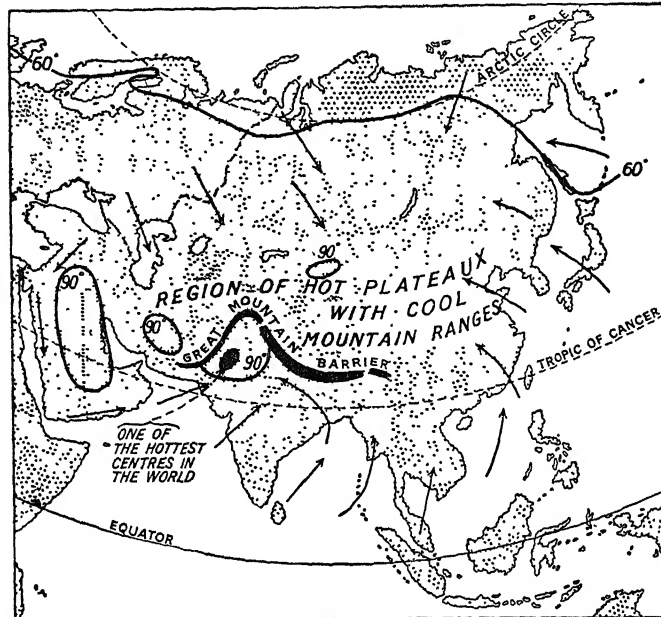


FIG. 198.—Conditions in the hot season showing July temperatures and winds.

The sun is shining vertically over the Tropic of Cancer and large areas get very hot. The cool rain-bearing winds are blowing inwards towards the low-pressure centres lying over the hot areas.

Summer conditions are shown in Fig. 198. In summer the interior of Asia becomes very hot and low-pressure areas are formed. The chief of these is in the north-west of India over the Punjab plains, and is responsible for the well-known Indian monsoon. Although at a considerable elevation, the interior plateaus with the Desert of Gobi become greatly heated, but the winds which are drawn in across China towards these centres are not as strong as the south-west monsoon of India. The inflowing winds of summer are from the ocean and therefore moisture laden. As shown in Fig. 199, summer is the rainy season over most of Asia.

Climatic and Natural Vegetation Regions. Nearly all the principal types of climate are represented in Asia with the exception of the tropics.

The Tundra stretches as a belt across the north (Arctic climate).

The Coniferous Forest Belt lies to the south of the Tundra and also stretches right across the continent.

It should be remembered that much of the forest suffers from the marshy nature of the Siberian lowlands.

The Mid-latitude Grasslands or Steppes occupy two principal areas

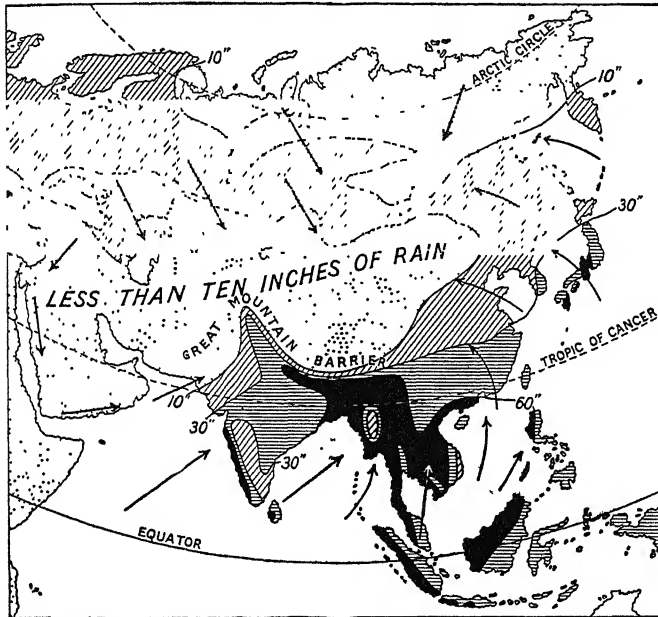


FIG. 199.—Conditions in the hot season—rainfall from May 1 to October 31.

The warm moist winds bring a heavy rainfall to the coasts. All parts marked black have more than 60 inches of rainfall. But the winds lose all their moisture before they reach the hot interior of the continent, which has less than ten inches of rain in the half-year.

—South-Western Siberia and a fringe round the Mongolian plateau. The latter area is perhaps the least developed of all the tracts of mid-latitude grassland in the world (Mid-latitude Continental Climate).

Mediterranean Vegetation occupies a small area in the south-west of Asia—the fringes of Asia Minor and Syria, where the continent borders the Mediterranean Sea. Much of Mesopotamia and, indeed, of Persia and Baluchistan might be described as having a very dry type of Mediterranean Climate.

Deserts and Semi-deserts occupy a very large area in South-Western and Central Asia, as shown in Fig. 200 (Hot and Mid-latitude Desert Climates).

Temperate Deciduous Forests are not a characteristic type of Asiatic vegetation. As in North-Eastern America there is, in North-Eastern Asia, an area with an East Coast type of climate and though deciduous trees flourish, coniferous trees are more conspicuous in the natural vegetation (e.g. Japan).

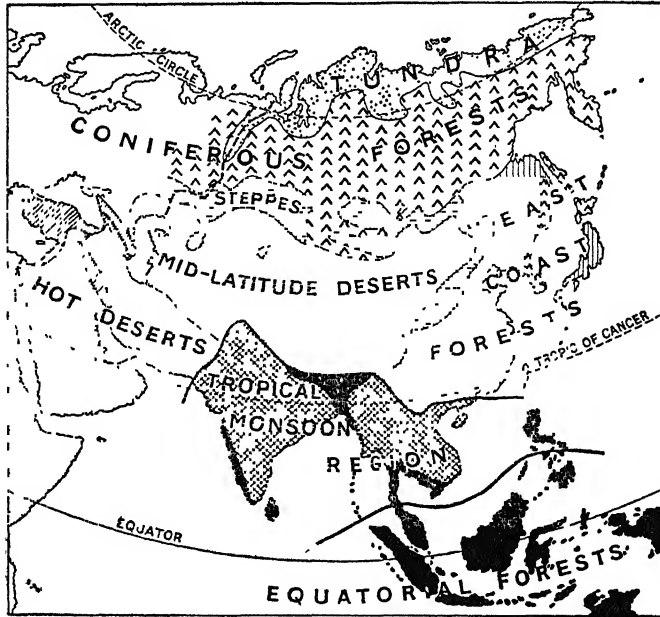


FIG. 200.—The natural vegetation of Asia.

Compare this map with what is said about the climates of Asia. In the part marked "Monsoon Region" evergreen forests are found in the wettest parts, monsoon forest in the areas with a moderate rainfall; scrubland where the rainfall is poor, and desert in the driest parts.

Warm Temperate Forests may be described as the characteristic vegetation of China, though the forests themselves have been removed over very large areas (China type of Climate).

Monsoon Forests vary in character according to the amount of rainfall, and will be described in detail under India (Tropical Monsoon Climate).

Hot, wet, evergreen forests are not restricted to the area having a typically Equatorial Climate, but extend also, as shown in Fig. 200, to the wetter parts of the monsoon lands.

Population. Asia, which is the largest continent, has also more people than any other continent. But, curiously enough, most of

the people are found in two countries—India and China. Look at Fig. 201 and notice how thickly populated these countries are in comparison with other parts. There are also large numbers of people in Japan and the East Indies. Just as the Himalayas form a great climatic barrier, so they form also a great barrier to man, and divide the two great races of mankind—the yellow-skinned, oblique-eyed Mongolians on the one side and the brown-skinned Indo-Europeans (including the Indians) on the other.

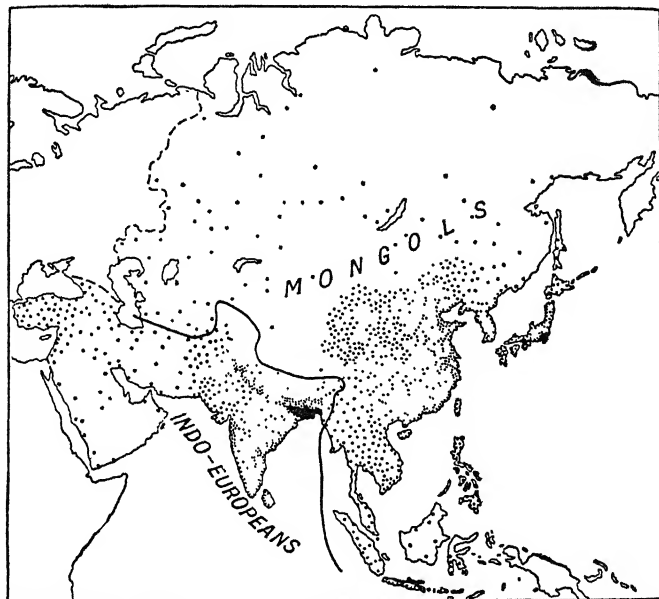


FIG. 201.—The population of Asia.

Each dot represents half a million people. Notice that the thickly-populated countries are India, China, Japan, and Java. This little map is drawn on Gall's Projection, and so Asia appears a different shape from what it does on Figs. 196–200

Asia is often called the continent of extremes. It has the highest mountains and the highest plateaus as well as the largest stretches of lowland in the world; it has the coldest as well as some of the hottest places, the wettest and some of the driest, the most thickly populated and some of the most thinly peopled lands in the world.

INDIA AND PAKISTAN

The name India is still commonly used to designate the great sub-continent of Southern Asia, cut off from its neighbours by walls of mountains, which since 1947 has been divided into the two countries of the Republic of India and Pakistan. These two countries do

indeed cover what is a geographical whole. It is best now referred to as the Indo-Pakistan Sub-Continent.

In the course of the 18th and 19th centuries India came gradually under the control of the British East India Company until the possessions of the company were taken over by the Crown and Queen Victoria was proclaimed Empress of India in 1877. At a later date (until 1937) Burma was also included in the British Indian Empire. For seventy years India was divided into (a) British India comprising a number of provinces, the boundaries of which

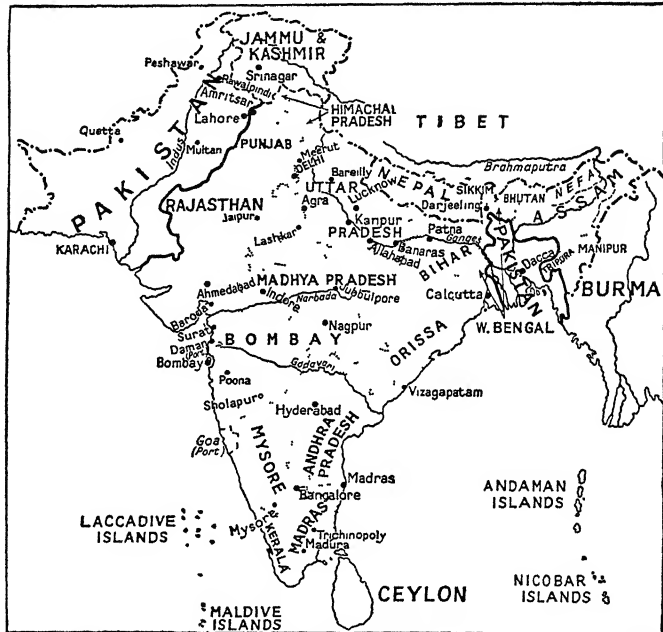


FIG. 202.—India and Pakistan.

were changed from time to time, and (b) Indian India or the Native States, large and small, ruled by their own princes with British advice. In 1947 the British Government handed over the whole country to the control of the Indians and Pakistanis themselves.

Position and Size. India lies entirely to the north of the equator. The southernmost point of the mainland, Cape Comorin, is in latitude 8° N. The Tropic of Cancer passes right through India, cutting the country into two. Although roughly half of India lies outside the Tropics, in the Temperate Zone, we always think of India as a tropical country, because it is well marked off from the rest of Asia by its mountain wall, and has a common type of climate throughout. India and Pakistan stretch from longitude 61° E. to 97° E.—that is, one-tenth of the way round the globe.

Longitude 70° E. passes through the Indus Valley, and 90° through the Delta of the Ganges.

India and Pakistan have together an external 5,000 miles of land frontier and 4,000 miles of sea frontier, and a combined area of 1,550,000 square miles. Notice the favourable position for sea trade—with Europe *via* the Suez Canal; with Africa; with the Far East *via* Singapore; and with Australia. India takes its standard time from the meridian of 80° 30', which is 5½ hours ahead of Greenwich time; West Pakistan takes its time from Karachi, East Pakistan from Decca (6 hours).

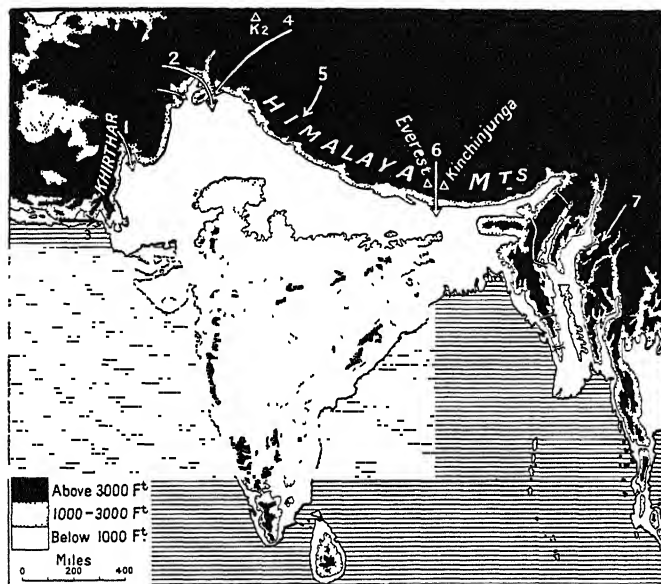


FIG. 203.—Physical or contour map of Indo-Pakistan.

The numbers refer to the passes enumerated in the text.

Physical Features. Indo-Pakistan is divisible into three main parts:

1. A great mountain wall.
2. A great lowland plain, the plain of northern India, through which flow three great rivers, the Indus, Ganges, and Brahmaputra and their tributaries, formerly called the plain of Hindustan.
3. A great plateau, the plateau of Peninsular India.

Compared with the size of the country, the coast-line of India is short, for there are few bays or gulfs. Places in the heart of India, like Delhi and Nagpur, are thus a long way from the sea. The result is that India has few good harbours. The west coast of Peninsular India is rocky, and the sea is deep quite close to the

coast. There are three inlets which form good natural harbours—Bombay, Goa, and Cochin; but the last of these was blocked by sand now dredged. The east coast of Peninsular India is less rocky, but the sea along the coast is too shallow for ships to approach the shore, whilst the surf makes it dangerous to land in small boats. The most important port on this coast, Madras, has an artificial harbour. Where the great Plain of Northern India reaches the

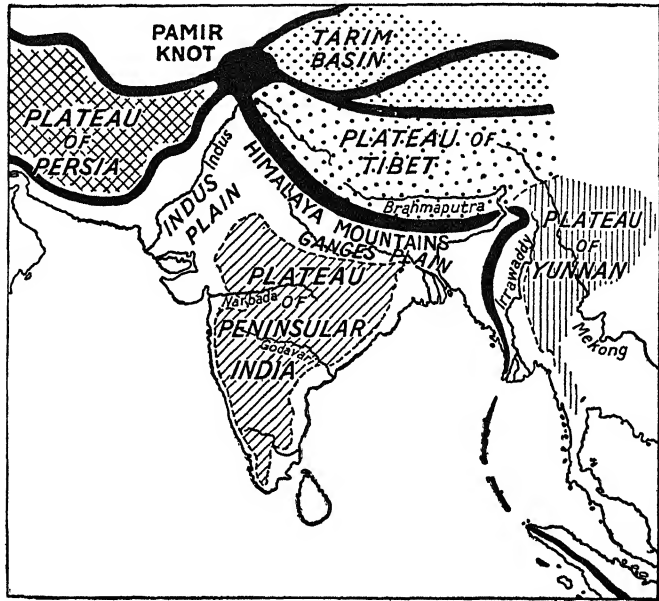


FIG. 204.—The mountains and plateaus of Southern Asia and the physical regions of India.

coast the only harbours are certain river mouths, such as the River Hooghly on which Calcutta stands.

Ceylon is the only important island lying off the coast of India, to which it is very nearly joined by a line of sand-flats and rocks called Adam's Bridge.

The Mountain Wall. From the Pamir Knot in the north the greatest range of all is that of the Himalayas (the "abode of snow"), with many of the highest mountains in the world: Mount Everest, 29,000 feet; Kinchinjunga, 27,815 feet; and many others. Another great range, which is really a northern branch of the Himalayas, runs eastwards from the Pamir Knot, and is known as the Karakoram Range. One of its highest peaks is Mount K², or Mount Godwin Austin (28,250 feet). To the north of the Himalayan Range lies the plateau of Tibet, the highest in the world.

Running south-westwards from the Pamir Knot and separating India proper from Afghanistan and Baluchistan, is the Sulaiman Range, passing southwards into the Kirthar Range.

The mountain wall between India and Burma has received various names. In the north it is a narrow wall, and is known as the Patkoi Hills; then it broadens out into the Naga Hills and the Manipur Plateau, sending out a great branch westwards into Assam. This branch forms the Jaintia, Khasi, and Garo Hills. Southwards from Manipur are the Lushai Hills, and then again a narrow wall known as the Arakan Yoma. The Arakan Yoma reaches the sea at Cape Negrais, but is continued in the Andaman and Nicobar Islands.

The Plain of Northern India. Inside the mountain wall, and forming a great curve from the Arabian Sea to the Bay of Bengal, is one of the most important plains in the world. It occupies the greater part of Northern India, and is more than 2,000 miles from end to end, and usually from 150 to 200 miles broad. This great plain is formed by the basins of three rivers and their tributaries. In the west and draining into the Arabian Sea is the River Indus. Farther east is the River Ganges, which flows south-eastwards into the Bay of Bengal. The city of Delhi, the proud capital of India, stands nearly on the water-parting between these two river basins. Before the Ganges reaches the sea it is joined by the third of the mighty rivers, the Brahmaputra.

Throughout the whole of the plain of northern India there is not a hill to be seen. The floors of the river valleys rise so gradually that the slope cannot be seen. Nearly 1,000 miles from the mouth the surface of the River Ganges is only 500 feet above sea-level.

The Plateau. Nearly the whole of India south of the great plain of the north is occupied by a plateau. The western side is the higher, and the surface slopes down towards the east. The western edge of the tableland is known as the Western Ghats. In the same way the lower eastern edge forms the Eastern Ghats. The Eastern Ghats are interrupted by a number of river valleys. The plateau as a whole is higher in the south—in Mysore—than it is in the north.

Between the Western Ghats and the sea there is a narrow coastal plain; between the Eastern Ghats and the sea there is a broader coastal plain.

The surface of the plateau is by no means smooth. It has been deeply furrowed by river valleys. Then, towards the north a very important line of mountains runs across the plateau from west to east. These mountains are the Satpura Range, continued eastwards as the Mahadeo Hills and Maikal Range. This line is a very important one, for the mountains are not easy to cross, and so it cuts off "Northern India" from what is properly called "Peninsular

India." Throughout history this line has been an important barrier. There are two other parallel lines—the Vindhya Range to the north and the Ajanta Range to the south—which have helped to make the line more important.

Northwards from the Satpura line the plateau slopes down towards the plain of Northern India. In the north-west, interrupting the general slope, is the Aravalli Range.

Doors through the Mountain Wall of China. Generally speaking, the passes through the mountain rampart of India are few and far between. In the north-west the two chief gateways are the Bolan Pass marked (1) on (Fig. 203) and the Khyber Pass (2). Another is the Gomal Pass (3). Another route is along the sea-coast of Makran (4). There are two difficult roads leading from the town of Srinagar in Kashmir, across the Zojila Pass and the Karakoram Pass (5). From Punjab to Tibet is the Shipki Pass (6); but for hundreds of miles there is no route across the Himalayas until Darjeeling (7) is reached.

Across the mountains between India and Burma there are four main routes—the Tuzu Gap, the Manipur Route, the An and Taungup Passes. They are very little used, and nearly everyone goes to Burma by sea or air—from Calcutta or Madras to Rangoon. During the Second World War, when the allies crossed the mountains to drive the Japanese out of Burma, motor roads were built roughly along the lines of the first two, but the roads are now disused.

The Rivers of Northern India. The great rivers of the plain of Hindustan all rise in the mountain wall or beyond it. The rivers are fed with water from the gradual melting of the snow which lies on the mountains. They do not depend for their water entirely on the monsoon rains; they depend on the snow and rain which fall in the mountains at other times of the year. So we find these rivers are never dry; they always have some water in them. In the mountains these rivers are roaring, rushing torrents, pouring through gorges or narrow valleys, over waterfalls, and amongst great boulders. When they reach the great northern plain, they become slow, broad rivers wandering lazily across the plain. So flat is the valley that often the rivers desert their bed and make a new course. The three great river systems of Northern India are:

1. The Indus River, with its tributaries the Jhelum, Chenab, Ravi, Bias, and Sutlej (the five rivers of the Punjab).
2. The Ganges River, with its tributaries the Jumna, Gogra, Rapti, and Gandak.
3. The Brahmaputra River, which has no important tributaries.

The Rivers of Peninsular India. The rivers of Peninsular India are quite different from the rivers of Northern India. They rise in

the hills of the plateau, and they are fed only by the monsoon rains. In the Dry Season they often become almost dry—so nearly dry that only the smallest boats can use them. Owing to the general slope of the plateau, the rivers rise near the Western Ghats and flow towards the Bay of Bengal. The most important are the Mahanadi, Godavari, Kistna, and Cauvery.

In the north of the plateau, however, two important rivers, the Narbada and the Tapti, both flow westwards. The Narbada occupies a deep trench between the Vindhya and Satpura mountains

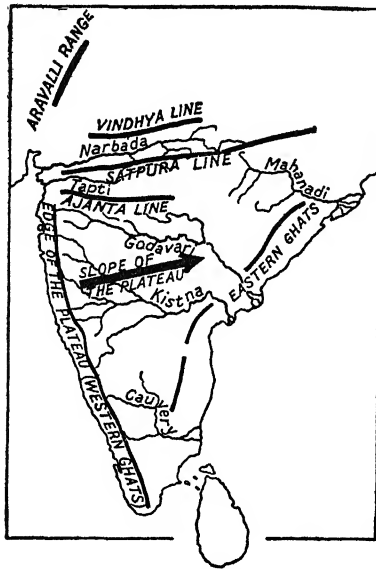


FIG. 205.—The rivers of Peninsular India.

and thus helps to reinforce the importance of those mountains as the real barrier between Northern and Peninsular India.

The Rivers of Baluchistan and Tibet. Both Baluchistan and Tibet are very dry countries. The rivers only flow after rain, and empty into shallow lakes, which often dry up in the Hot Season. These areas are thus regions of inland drainage.

Importance of the Rivers. In nearly all respects the rivers of Northern India are more important than those of Peninsular India.

(a) They yield a constant supply of water which can be used for irrigation.

(b) They traverse, in their lower courses, broad, flat plains of fertile alluvium, very suitable for irrigation.

(c) They afford good highways of communication, though they are much less used than formerly.

On the other hand, the rivers of Peninsular India—

- (a) Do not yield a constant supply of water.
- (b) Have valleys less suitable for irrigation.
- (c) Are not navigable for long periods of the year.

Notice also that the rivers of Northern India have a long upper course in the mountains; the rivers of Peninsular India have not.

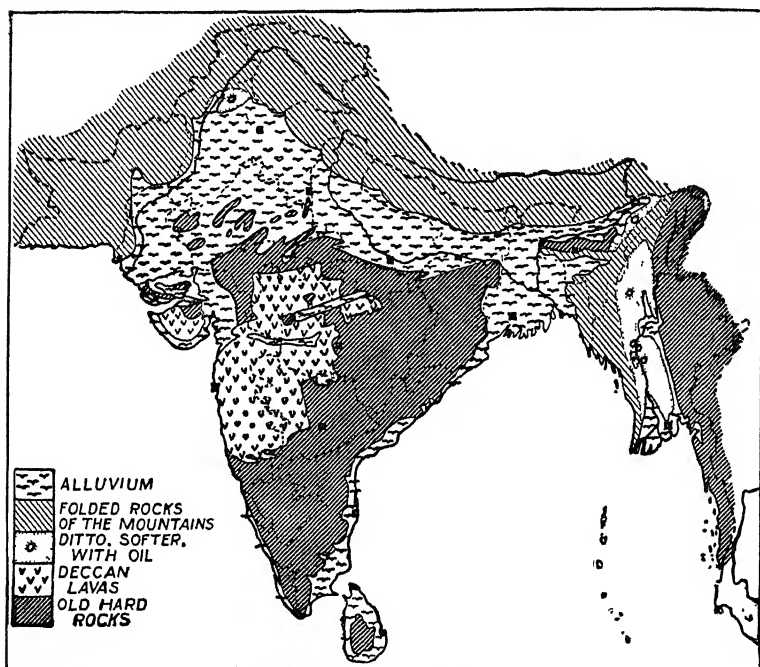


FIG. 206.—Geological map of India, Pakistan and Burma.

Note.—The area marked as alluvium in Ceylon is largely a lowland of laterite covering old hard rocks.

Geology and Minerals. The main features of the geology of India correspond very closely with the physical features. The mountain walls consist mainly of folded sedimentary rocks. The plain of the north consists almost entirely of alluvium, and so do most of the coastal strips, and, of course, the river deltas. In the Ganges Valley the alluvium is many hundreds of feet thick. In the Upper Ganges Valley and the Punjab, the “Older Alluvium,” as it is called, contains hard calcareous concretions about the size of nuts known as “kankar.” In a country where there is no stone even these

small nodules have value as road metal. The Indian Plateau consists mainly of very old crystalline rocks. This mass of old rocks was in existence long before the great Himalayan fold mountains were formed; it has for long ages formed a "stable massif" of much-altered and folded rocks. On the edge of the plateau are areas of sedimentary rocks, important because they are coal-bearing. Nine-tenths of the coal of India comes from the Jharia and Raniganj fields, in the north-eastern part of the plateau, but there are also coal-bearing beds in the Godavari Valley and on the northern slopes of

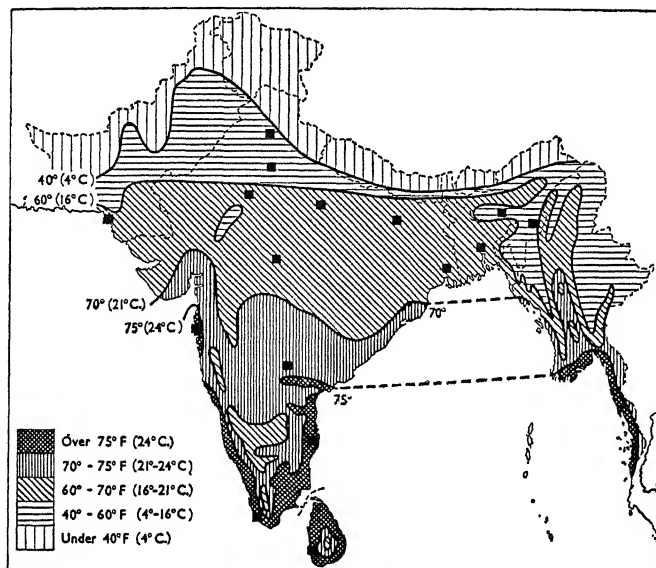


FIG. 207.—Temperature map of India, Pakistan, and Burma for January.

the plateau. Nearly the whole of the north-west of the plateau has been covered by great sheets of lava—the Deccan lavas. This region is one of the largest areas of lava in the world. Many valuable minerals occur associated with the old crystalline rocks. Gold is obtained especially from the Kolar Goldfield. Manganese comes mainly from the Central Provinces, but is also found near Vizagapatam, in the Singhbhum District of Bihar, and in Mysore. Copper and iron ores are found in other parts of the plateau, especially in Bihar. Iron ore used to be smelted in small quantities in many parts of India, but this village industry has almost disappeared. Instead a large iron and steel industry has been developed at Jamshedpur near the coalfields already mentioned. Mica is mined in Madras, and in the north-east of the plateau.

Care should be taken in reading older accounts of mineral production in India as the figures before 1937 include the rich mineral-producing country of Burma. It should be noted that most of the minerals are produced in the Republic of India, not in Pakistan.

Mineral oil, or petroleum, is found in young soft rocks, usually on the borders of great fold ranges. India is not rich in oil though some is obtained in Assam, and small fields are now being worked in western Pakistan.

Climate. Considering first conditions during the *Cold Season* when the thermal equator lies far to the south of India, there is, as one would expect, a gradual decrease in temperature from south to north—from a January average of 80° at Trivandrum to one of 55° at Lahore. At this season India is under the influence of cool,

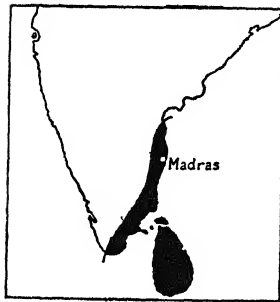


Fig. 208.—Cold season rains in Southern India and Ceylon.

Map showing the part of Peninsular India which has not less than 10 inches of rain in November and December.

outblowing land winds—actually the North-East Trades. But the mountain wall protects India from the icy blasts which sweep over China in the winter. The winter is normally the rainless season in India. In the north-west, however, cyclonic rains fall during the winter months in the Punjab and may represent the ultimate eastern extension of the winter rain belt of the Mediterranean Sea. The October-December rainfall of the Madras Coast and Ceylon (Fig. 208) is due to storms coming at the end of the monsoon.

In February, March, April, and May the thermal equator moves gradually northwards, and by June and July the centre of great heat is over the Punjab—at this season one of the hottest areas of the world (Fig. 209). The low-pressure centre thus formed over north-west India results in the monsoon. As shown in Fig. 210 the actual direction of the winds is controlled by the physical features of the country. The monsoon “breaks” at different times in different parts of India; the middle of June may be taken as an average date.

It is customary to distinguish three seasons in India—the Cool Season (dry), from November to January; the Hot Season (dry), from February to early June; and the Rainy Season, from June to October.

Rainfall and Natural Vegetation. As stated above, India receives most of its rain from the South-West Monsoon, and hence the rain falls from June to October. Fig. 211 is a simple rainfall map of India and demonstrates the separation of four rainfall-vegetation regions:

(a) Areas with more than 80 inches of rain per year—in the plains rice is everywhere the leading crop, whilst the hills are clothed with evergreen forest of equatorial type.

(b) Areas with between 40 and 80 inches of rain—areas where the deciduous monsoon forests with the valuable teak and sal flourish, the trees losing their leaves in the hot, dry season. In the plains many crops can be grown without irrigation and there is a mixture of wet-zone and dry-zone crops.

(c) Areas with between 20 and 40 inches of rain, where the natural vegetation is scrub and thorn forest, and where dry-zone crops, such as millets, grow.

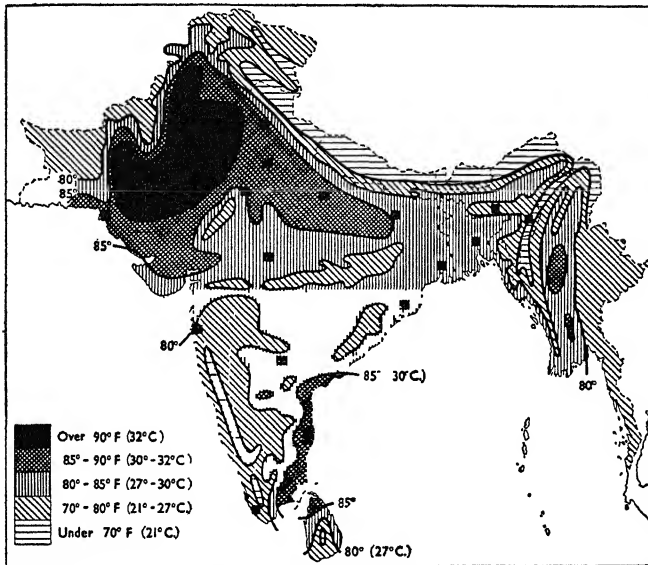


FIG. 209.—Temperature map of India, Pakistan, and Burma for July.

(d) Areas with less than 20 inches of rain, forming deserts and semi-deserts and where irrigation is practically essential.

In addition to these four main types of vegetation, the remarkable differences between which are mainly due to variations in rainfall, there are the mountain forests which occur above the frost line (about 5,000 feet in Southern India, 3,000 feet in the Himalayas) which include both broad-leaved evergreen oak forests and coniferous forests. Mangrove swamps grow along those portions of the flat, muddy sea coasts and over the great river deltas which are

flooded by the tides—especially round the old mouths of the Ganges where they form the “sundarbans.” Patches of grassland interrupt the monsoon forests on the hills, and much of the open thorn forest has a carpet of grass, but otherwise grassland is not characteristic of India. It must be remembered that India is a very densely populated country and the natural vegetation has been almost entirely removed over such fertile tracts as the alluvial plains of Northern India.

Forests and Forestry. About 160,000 square miles of land in the Republic of India—roughly 15 per cent. of the total area—as well as nearly 10,000 square miles or 2½ per cent. of Pakistan are classed

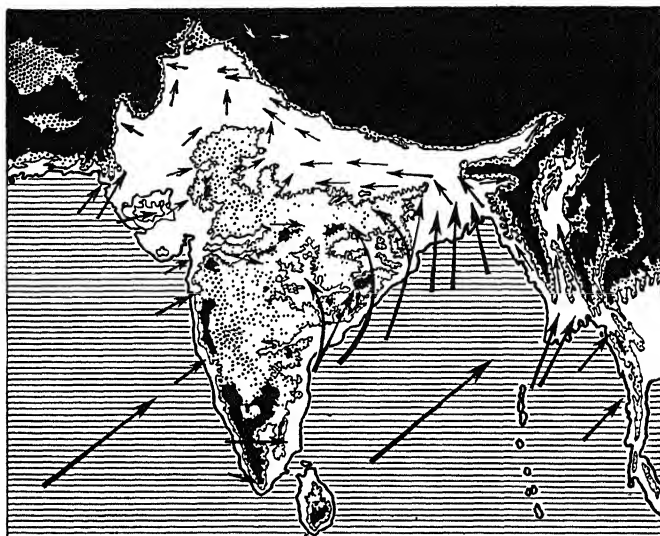


FIG. 210.—Map of India showing monsoon arrows.

as forests. More than half are “Reserved Forests,” the exploitation of which is carefully regulated by Government. The Central Provinces, the eastern and western slopes of the Western Ghats in Bombay and Madras, and the slopes of the Himalayas are the most important forested areas. The most valuable timber is teak, but there is not very much in India—it is mainly from Burma and Siam. The sal is a good timber tree of the north-eastern plateau and lower slopes of the Himalayas. The pine forests and the deodars of the Himalayas yield good timber but the forests are difficult of access.

Many of the poorer kinds of wood in all parts of India are used for firewood. The mangrove forests are found in deltas where no other wood is available, and are therefore valuable for fuel.

Bamboo is really a very large grass which grows in many parts

of India, but especially in the Monsoon Forests, and has a great variety of uses. Another forest product is lac, a sticky substance produced by insects living in the forest trees.

The method of working the timber of the forests is interesting. It is cut in the dry season and dragged to the small streams by elephants or buffaloes. When the rains come the streams rise, and the logs are floated down to the bigger rivers. These logs are joined together to form "rafts" and floated down the rivers to sawmills.

Agriculture. India is essentially an agricultural country. Three-quarters of the vast population depend on agricultural pursuits for

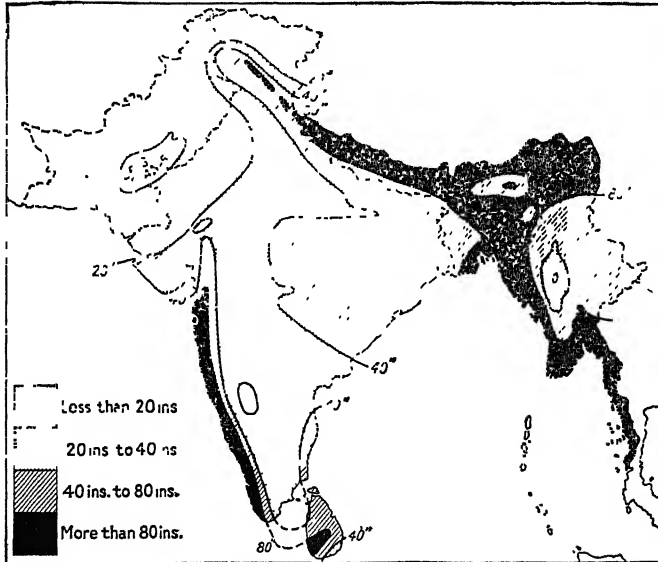


FIG. 211.—Rainfall map of India, Pakistan, and Burma for the year.

In the centre of Peninsular India a small patch has been left blank. How should it be shaded, and why?

their existence. With its huge population there is little or no surplus of food for export, though agriculture supplies the staples of India's export trade—cotton, jute, tea, and oilseeds. A little over half the total land area of India and Pakistan is cultivated—about 42 per cent. sown every year and a further 9 per cent. lying temporarily fallow. About a quarter of all the land sown is irrigated. The land cropped represents about 0·8 acre per head of population. The total yield of food grains is about 54,000,000 tons a year or $1\frac{1}{2}$ lb. per head per day.

The following table shows the relative importance of the chief crops:

	India per cent.	Pakistan per cent.	Sub-Continent per cent.	
Food grains	65.5	71.4	66.2	Food Crops 70.1%
Rice	20.0	37.2	22.3	
Wheat	7.8	18.7	9.3	
Barley	2.1	1.0	2.0	
Millet (jowar, bajra, ragi)	22.7	6.1	20.3	
Maize	2.4	1.8	2.3	
Gram and peas	6.8	5.6	6.7	
Beans	3.7	1.0	3.3	
Sugar	1.3	1.7	1.4	
Other food crops	2.5	2.0	2.5	
Oilseeds	7.4	3.6	6.7	Non-Food Crops and Fallow 29.9%
Cotton	5.1	5.9	5.2	
Jute	0.7	2.7	0.8	
Other non-food crops, fodder and fallow	17.5	12.7	17.2	

The chief oilseeds, in order, are ground-nuts, sesamum, rape, mustard, linseed, castor, and coconuts.

Rice is grown mainly on flat, alluvial land where there is an abundant rainfall. Its distribution is shown in Fig. 212. This should be compared with the rainfall and physical maps. It forms the staple food of the people in the wetter regions of India. In the drier regions it becomes less important, and where the rainfall is less than 40 inches it can only be grown on irrigated land.

Wheat, which forms the principal food grain of most white races, has become the favourite food in the drier parts of Northern India. It is there a winter crop, so that the land can often be used for other purposes during the rest of the year. It is sown at the end of the rains, and ripens at the end of the year before the great heat commences. In some years a surplus is available for export to Europe via Karachi. The pre-1914 export disappeared during the inter-war years, and latterly there has been an import of wheat from Australia. Wheat is a very important crop in the Punjab and many of the northern parts of India. It is grown mainly on irrigated land where the rainfall is less than 40 inches. As we travel down the Ganges Valley into wetter regions it gradually disappears.

Barley. Barley is another important crop which grows largely in the same districts as wheat.

Millet forms the "staple" food of the people in most of the drier parts of India. There are several different kinds, the three principal being *cholum* or *jowar*, *cumbu* or *bajra*, and *ragi* or *marua*. Where the rainfall is less than 40 inches millet is everywhere important, and it can be grown without irrigation even when the rainfall is as low as 20 inches. When the rainfall exceeds 40 inches it quickly disappears. Fig. 212 also shows the distribution of millet.

Maize flourishes both on the plains and in the hills where the rainfall is moderate. It is grown as a subsidiary food grain and for fodder in many parts of India but only among certain hill tribes is it the chief grain. We find it with millet in dry regions, but also in damper regions too. But in the Lower Ganges Valley with a rainfall of 60 inches it disappears.

Pulses of many different kinds are cultivated throughout the country. The most important is gram, which affords a good food as well as fodder for cattle and horses.

Sugar-cane is grown in nearly all the provinces of India, but most comes from the irrigated lands of the Upper Ganges Valley and the Punjab. From it jaggery (or jagri) the native brown sugar is made. Recently much more sugar has been produced in India, formerly huge quantities were purchased from Java every year.

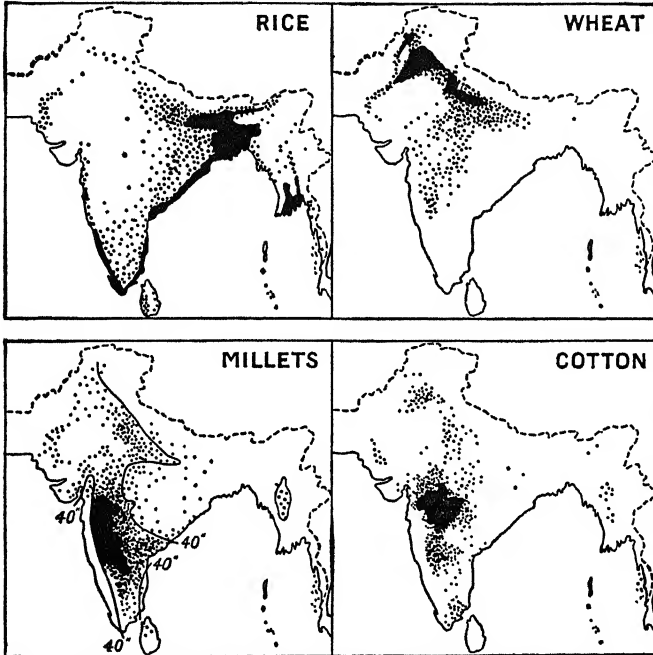


FIG. 212.—The distribution of some leading Indian crops.

Cotton is the most important of the crops not grown for food. In India there are two principal kinds:

- (a) Native Indian short-stapled cotton.
- (b) American upland cotton.

Cotton is a dry-region crop, and flourishes where the rainfall is less than 40 inches. The soil is important; one of the best for native cottons but not for American is the sticky black cotton soil produced by the weathering of the Deccan lavas. The American cottons are grown mainly on irrigated alluvial soil in the Punjab and United Provinces.

Jute is a crop of which India enjoys almost a world monopoly. In India its cultivation is restricted almost entirely to the very wet lands of the Ganges Delta.

Oilseeds. Plants grown for the sake of the oil obtained from their seeds include linseed, rape, mustard, sesamum, and ground-nuts. They grow best with a light or medium rainfall, and often prefer slightly hilly country. Ground-nuts, in particular, favour light sandy soils of little use for other crops. A good proportion of the crop is grown for export.

Coconuts grow best in wet regions along the coast and are grown down the west coast, in the island of Ceylon, in the Nicobar and other islands of the Indian Ocean, and on parts of the east coast.

Tea. The tea-plant is a shrub which requires a heavy rainfall, but must be grown on hill slopes or where the water does not remain near the roots. Most of the tea is grown for export. The hill slopes bordering the Brahmaputra Valley in Assam, the Himalayan slopes near Darjeeling and Dehra Dun, and the slopes of the Nilgiri Hills in Mysore and Madras are the chief centres. Tea is obtained from the dried leaves of the shrub.

Coffee was once important in several districts in Southern India as well as in Ceylon. Disease ruined the industry and foreign competition, mainly South American, has prevented a resuscitation of the industry, except in Mysore.

Tobacco. Soil is often more important for tobacco than rainfall, and a little is grown in most districts of India. In some places, like the country near Madras, enough is grown to be exported.

Rubber. There are numerous rubber plantations in southern India, notably in Travancore.

Indigo is a small plant from which a purple dye is made. It used to be important in the Ganges Valley, but the advent of cheap coal-tar dyes practically killed the industry, and the growing of indigo is not nearly so important as it was.

Opium is obtained from the seed-capsules of the opium poppy, and large quantities used to be sold to China. The Indian Government, for the benefit of humanity, suppressed this lucrative trade, and only a little for medicinal purposes is now grown and exported.

Animals. The chief animals of India and Pakistan are, with probable approximate numbers in millions:

	India	Pakistan
Cattle	159	31
Buffaloes	45	7
Sheep	39	6
Goats	57	10
Pigs ¹	5	0.1
Horses and ponies	1.5	0.5
Mules	0.06	0.04
Donkeys	1.3	0.9
Camels	0.6	0.4

¹Pigs, being considered unclean animals by Moslems, have never been counted even approximately, but have been estimated by FAO (1953).

Animals play an extraordinarily important part in the life of an agricultural country such as India. Oxen and buffaloes are used almost exclusively for ploughing and, except in the towns, are the principal draught animals. The horses and ponies are numerous in the towns; ponies and donkeys are much used in hilly regions; camels and donkeys in the drier areas. An important animal not mentioned in the list above is the *elephant*, used especially in timber working and as a beast of burden in forested country. Large numbers of wild elephants still live in the less accessible parts of the monsoon forests and every year many are caught and trained,

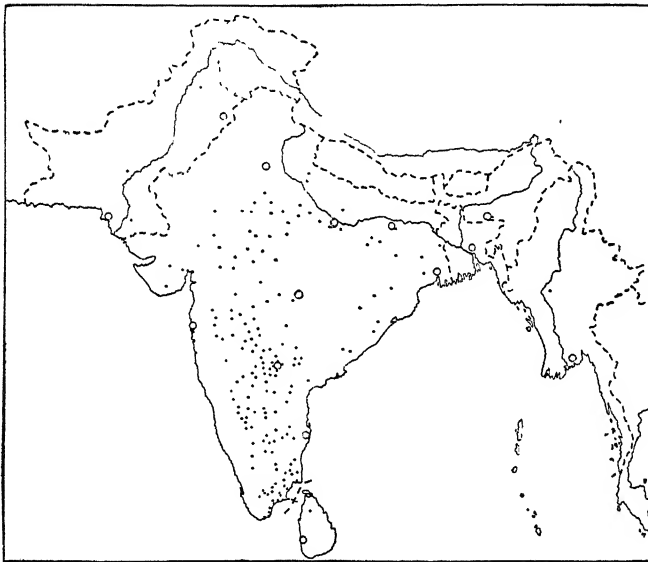


FIG. 213.—The distribution of sheep in India, Pakistan, and Burma.

Each dot represents 50,000 sheep.

especially in Burma. They are driven into a strong wooden enclosure called a keddah. The keddah is very narrow and the elephant cannot turn round and so charges the end till tired out. The beast is then chained to a tame elephant for training purposes. Contrary to the usual belief, the elephant is a very delicate animal and requires careful attention.

Oxen. The enormous numbers of oxen in India—in the whole sub-continent there are probably 175,000,000 or one for every two inhabitants—are the outcome of their use in ploughing. A pair of bullocks is the vital possession of every farmer working on his own, and in some parts of India the necessary qualification of a bridegroom

—the argument being that without them he could not support himself and his bride. The cow is a sacred animal to the Hindus and so is not used as food and, moreover, the animals are allowed extraordinary liberty in wandering about—and incidentally polluting—villages, towns, and private dwellings. The manure when dried supplies fuel, but the Indian has not learnt to make full use of the animals. The milk is often untouched; of the carcass the hide is often the most valuable part. Dairying has been established only in a few scattered areas, mainly in the United Provinces. In many of the drier parts of India there is not sufficient grass to feed the oxen, so fodder has to be grown for them.

Buffaloes. There are probably 50,000,000 buffaloes in India. The buffalo is heavier and stronger than the ox, but slower. Although the buffalo is very fond of the water, whence the name “water buffalo,” and is much used in the rice fields of wet regions for ploughing, we also find large numbers in the drier parts of India, as in the United Provinces.

Sheep. There are probably 46,000,000 sheep in India, mainly in the dry hilly parts, where they live on grassland or waste land which is not good enough for cattle. They are most abundant in Madras. Compared with the sheep of other parts of the world, those of India are very poor and yield neither good wool nor good meat.

Goats. Goats are to be found everywhere in India, for they are very easy to keep. They can live on the poorest of grass or shrubs, and find enough to eat even in the driest parts.

Horses and Ponies. There are less than two million horses and ponies in India, which shows that horses are not used for ploughing as they are in other countries of the world.

Camels. The distribution of camels in India affords an interesting example of climatic control—very evident from Fig. 214.

Irrigation in India. In times past India has suffered terribly from famine. The “famine areas” are for the most part those with a moderate rainfall, where in normal years the rainfall is quite sufficient to produce excellent harvests of “dry” crops—crops grown without permanent irrigation. The drier parts of the plateau suffer most from years of deficient rainfall, and in the old days many thousands of people perished. The advent of railways and efficient organization in the despatch of supplies to the threatened area have rendered decimation by starvation almost a thing of the past. It is to be noted that famine is not to be feared so much in the *driest* parts where there are permanent irrigation works, but in regions of intermediate rainfall. The huge area of India irrigated has already been noted—ten times the total area of cultivated land in the most famous of all irrigated countries, Egypt.

Perennial Canal Irrigation is by far the most important type.

The British Indian Government spent £100,000,000 on irrigation works in India, mainly in the drier parts of the great Plain—in the Punjab, United Provinces, and Sind. Although the rainfall in these parts of the plain is poor, there is a never-failing supply of water in the rain-fed and snow-fed rivers from the Himalayas. Irrigation has transformed the Punjab into one of the leading provinces of India. It has been said, with but mild exaggeration, that “India adds an Egypt to its area every year, yet the world takes but little notice.” There are also important systems in Madras.

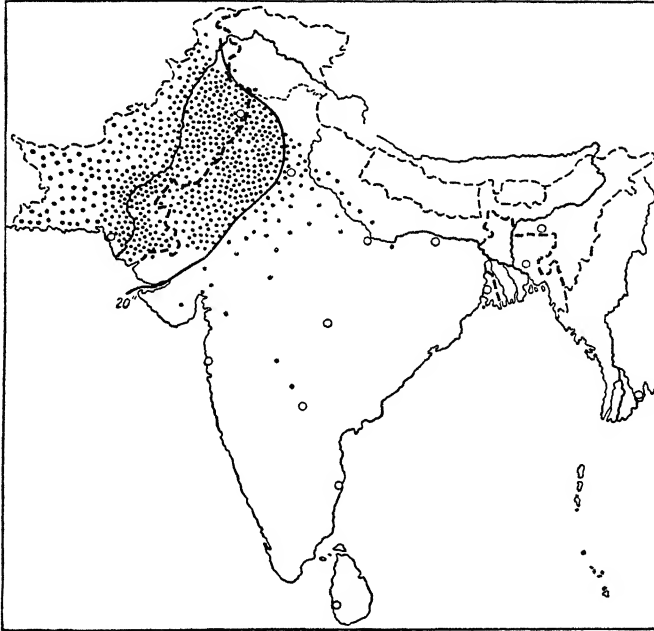


FIG. 214.—The distribution of camels in India and Pakistan.

Each dot represents 1,000 camels. The line marked is the 20-inch rainfall line.
Notice how nearly all the camels live where the rainfall is less than 20 inches a year.

Inundation Canals fed by the river during flood season, have been very important in the past, especially in Sind, but they are being replaced by permanent canals. They have the double disadvantage that just in those seasons when water is most needed they are liable to be but partly filled; they cannot take full advantage of the river supplies, and dry up in the Hot Season.

Tanks. In most of the drier parts of Peninsular India mud walls are built across the valleys of small streams, so that water collects and forms a pond or lake during the wet season. Such ponds or lakes are called tanks. When the rainy season is over, the water from the tanks can be used, but in the hot season the tanks dry up

completely. In bad rainfall years the tanks may not even be filled during the rains.

Wells. Although the surface of the land may be dry in the drier regions, there is often water at a short distance below the surface. This water can be reached by wells and brought up to the surface. There are innumerable hand-dug wells in parts of the northern plain not yet served by canals and great progress has recently been made with modern tube wells, pumped by electricity.

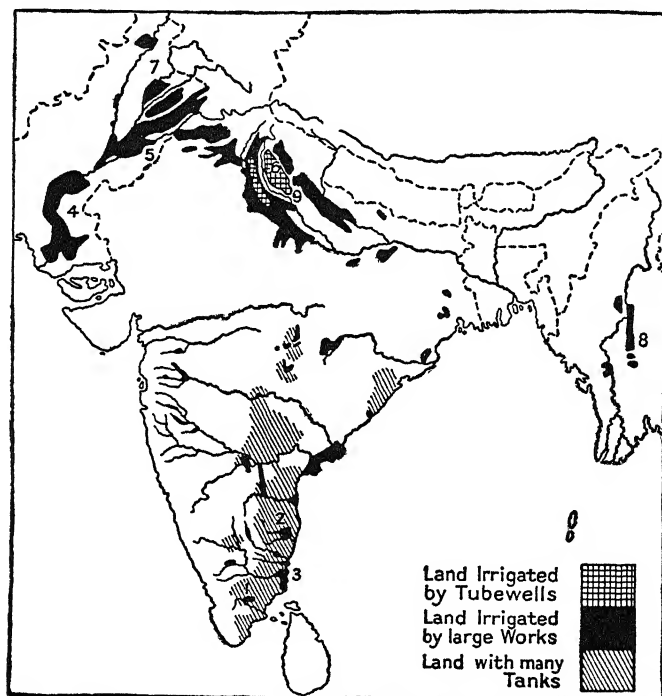


FIG. 215.—Irrigation in India, Pakistan and Burma.

1. Periyar system.
2. Cauvery delta.
3. Madras coastal area.
4. Sind (from the Sukkur barrage on the Indus).
5. East and West Punjab.
6. United Provinces.
7. Vale of Peshawar.
8. Central Burma.
9. Tube Well area.

Karez. In Baluchistan, but in no other part of India, there is a very clever system of irrigation. The rainfall on the hills is greater than on the plains, and when the little streams from the hills reach the plains, the water sinks into the ground. Long underground tunnels called karez have been constructed to reach this water at the foot of the hills and to bring it out on to the alluvial plains.

POLITICAL DIVISIONS

PAKISTAN AND THE REPUBLIC OF INDIA

India and Pakistan. The Indian Independence Act passed by the British Parliament in 1947 brought to an end the British government in India and made provision for the setting up of the Dominion of India and the Dominion of Pakistan. Both have a republican form of government, but both remain within the British Commonwealth of Nations. August 15, 1947, was thus the birthday of independent India (later proclaimed a Republic) and of Pakistan (renamed in November, 1953, the Islamic Republic of Pakistan).

Pakistan, as shown in Fig. 202, consists of two separate parts: (a) Western Pakistan and (b) Eastern Pakistan between which is a distance of nearly a thousand miles. The reason for this is that the boundaries of Pakistan were drawn so as to include the predominantly Moslem parts of India. It is now the most populous Moslem state in the world with an area of 361,000 square miles and a population of 71,000,000 at the time of its formation. Thus it covers rather less than a quarter of the whole of the Indian sub-continent and has rather less than one-fifth of the people. Eastern Pakistan comprises the eastern two-thirds of the former Province of Bengal. Western Pakistan occupies a solid block of country in the north-west comprising Sind (with the capital of Pakistan, Karachi), North-West Frontier Province, West Punjab (the western part of the former province of the Punjab), Baluchistan and the states of Bahawalpur and Khaipur. A site has been chosen in the north for a new capital.

The *Republic of India* comprises most of the remainder of the sub-continent with a total area of 1,220,000 square miles and a population of 337,000,000. The majority of the people are Hindus by religion so that the name Hindustan is sometimes used. Great changes have taken place since 1947. All the smaller states have either been merged into the provincial areas or have been grouped into unions. At first the position of the great state of Hyderabad was uncertain but later this state joined India. By the summer of 1950 only the position of Kashmir remained uncertain, being claimed with its Moslem population by Pakistan and with its Hindu rulers by India. Thus the old distinction between British India, divided into Provinces, and Indian India (or the Princes' India) divided into states has disappeared. The whole country has been reorganized, something on the model of the United States of America, with the old provinces and unions of states now forming the units of government or individual "states" like the states of the U.S.A. The capital of the Union of India or Republic of India is Delhi.

Included geographically within the mountain wall are the independent countries of Nepal and Bhutan. The Andaman and Nicobar Islands in the Indian Ocean belong to India but the Dominion of Ceylon is separate in every way.

Population. In the whole of India including Pakistan, there were, at the census taken in 1941, nearly 389,000,000 people. This represented an increase of nearly 50 millions since 1931. In 1947, at the time of the separation of India and Pakistan, the total population was estimated at about 408,000,000.

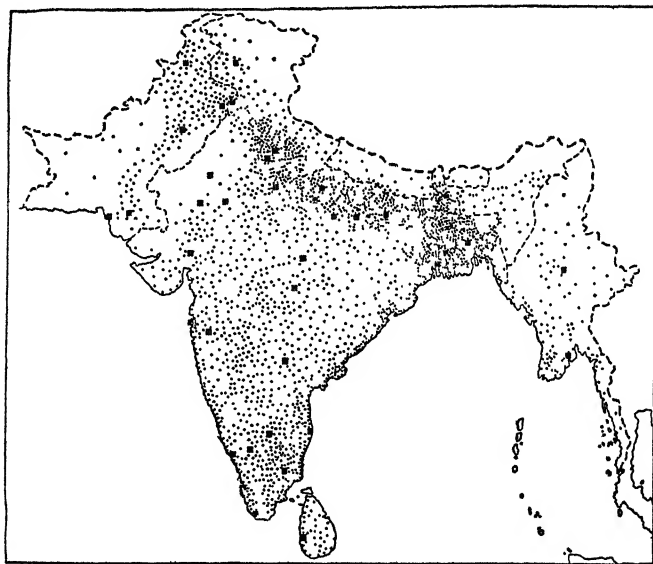


FIG. 216.—The population of India.

Each dot represents 100,000 people. Each square dot represents a town with more than 100,000 people.

At the census of Pakistan taken in 1951 the population was found to have increased to over 75,000,000 and the census of India in the same year recorded 357,000,000. The rapid increase thus continues—in India and Pakistan over 43,000,000 in the ten years 1941 to 1951. These figures are exclusive of Kashmir.

Fig. 216 is a population map of India on which each dot represents 100,000 people. By comparing this map with the physical, geological, and rainfall maps we find that the population is densest:

- (1) In the lowlands or slightly hilly regions;
- (2) On the tracts of alluvium;
- (3) In both dry and wet districts.

Compared with its size there are very few large towns in India.

The population is mainly "rural." India is an agricultural country; the population is densest where agriculture is most important.

The Races of People in India. The distribution of the different races of people in India is a result of the complicated history of the country. The original inhabitants are believed to be the "Pre-Dravidians." Then India was invaded by the Dravidians, who spread all over the country and drove the aborigines away to the hills and thick forests. There are scarcely any descendants of the Pre-Dravidians left now; the best example is the Veddass, who live in the forests in the wildest parts of Ceylon. After the Dravidians, India was invaded again and again from the north-west by clever, cultured, and educated peoples. The invaders—we may call them all together the Indo-Europeans or Indo-Aryan peoples—took possession of all the best lands, such as the fertile plain of Hindustan, and drove the Dravidians into Peninsular India, south of the Satpura line. The Satpura range of mountains formed one of the great barriers which prevented the spread of the invaders to the south. Wave after wave of different races poured into India and settled there, often intermarrying with the people they conquered, so that to-day the peoples of India are all very mixed, and it is often difficult to say whether they have descended from the Dravidians or the later invaders. It is much easier to classify the peoples according to the language they speak, or according to their religion. Just as India was invaded again and again from the north-west, so Burma was invaded again and again from the north. But the people who poured into Burma were quite different from those who went to India. Burma was invaded by Mongol peoples—that is, people like the Chinese with yellowish or yellowish-brown skin, smooth broad faces, and straight black hair. Nearly all the people living in Burma are Mongols. As in India, the wilder peoples were driven away to the hills, and one of the latest and cleverest invaders (the Burmans) seized the most fertile lands of the river valleys.

The Languages of India. The large number of languages spoken in India is also a result of the history of the country. In northern India, Hindustani, and in Southern India, Tamil, are the two native languages most widely used or understood, though English is the commercial language understood by educated Indians throughout the country. It must be remembered that most of the lower classes—indeed no less than 93 per cent. of the total population—are illiterate, unable to read and write any language.

Religion. More important than race, or even language, is religion. In India the lives of the people are often entirely controlled by religion. It determines their upbringing, education, customs, and habits, marriage, occupation, dwelling-place, type of home, and the architecture of their towns. One or two examples may be of interest. To the Hindu the cow is a sacred animal; the animals

are not killed even if useless, and numbers of sacred bulls do no work; the Hindus will not eat beef. To the Mohammedans the pig is an unclean animal, and they will not eat pork. It is forbidden for a Buddhist to take life, and he will not kill an animal for food. Early marriage is the custom among certain Hindus, and nearly all the girls are married before they are ten years old in certain parts of India. The strict observance of the "purdah" system, whereby a woman may not be seen by men other than her husband, has resulted in types of huts and walled yards which simplify this observance; in some parts the huts are scattered amongst the fields instead of being collected into villages.

We find in India that there are "religious centres"—famous places of pilgrimage or seats of learning connected with one of the religions. Thus Benares with its thousands of Hindu temples and its Hindu colleges is a centre of both the Hindu religion and the culture connected with it. Lahore is a great centre of Mahommedanism, whilst Rangoon and Mandalay in Burma and Kandy in Ceylon are centres of Buddhism. To the Hindus the River Ganges is the most sacred river in the world; to die or to be cremated on its banks is to gain everlasting peace. Hardwar, where the Ganges leaves the mountains, is one of the most sacred places of pilgrimage.

The two greatest religions of all—Hinduism, which may be called the national religion of India, and Mohammedanism—are widely distributed. Mohammedanism came to India with the later invaders from the north-west, and so we find it predominates in Baluchistan, North-West Frontier, Kashmir, and the Punjab. There is another strong centre of Mohammedanism in Bengal. These are the parts which have now become Pakistan. Hinduism predominates in other parts of India in what is now the Republic of India. Christianity was brought by seafaring peoples, and is strongest near the coasts.

Manufactures. Although India has always been an agricultural country, it has also been noted for the cleverness and skill of its people in handicrafts—making cloth and silk fabrics, working in metal, ivory, and wood. But machine-made articles can be produced so much more cheaply than hand-made articles, and India is fast taking her place in the world as a manufacturing country as well as an agricultural country. We can still distinguish:

- (a) The old native industries of hand-made articles.
- (b) The newer factory industries of machine-made articles.

Cotton Goods. The most important native industry has always been the weaving of cotton fabrics. Cotton is one of the native plants of India, and though enormous quantities are produced for export nearly half is used in the country. In some parts of India and Pakistan every house has its handloom where the women make

saris for themselves or dhotis for their husbands. More important now are the great cotton factories. The most important cotton manufacturing centre is Bombay, where a quarter of a million people are employed in the cotton-mills. There are also mills in Madras, Cawnpore, and in the Central Provinces. For the manufacture of cotton goods a certain amount of moisture in the air is required. Bombay has this right amount of moisture, Karachi has not. So that, although Bombay and Karachi are both ports exporting raw cotton, Bombay has in addition cotton-mills.

Jute. Just as Bombay is the centre of the cotton manufacturing industries, so Calcutta is the centre of the jute-mills, the raw material being produced in the Ganges Delta. A large quantity of jute is exported raw, but the mills round Calcutta and up the River Hooghly make large quantities of jute canvas and "gunny bags" or grain sacks. Most of the jute is grown in Pakistan; most of the factories are in India.

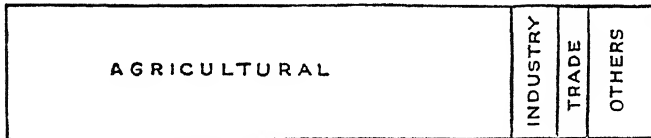


FIG. 217.—Occupations in India.

Silk. India has long been famous for its beautiful silks, and many of the fine old towns are still noted for special kinds. But the industry is very small when compared with cotton or jute. Much of the raw silk is imported from China, but native Indian silk is also produced. Bengal is the chief silk-producing province. Brocaded silk goods are made in Bengal, the Punjab, and Southern India; striped silks and the famous gold brocades all over Northern India at such centres as Agra, Benares, Amritsar, Ahmadabad, and Surat.

Woollen Goods. India has also long been celebrated for woollen goods, especially carpets and shawls. The weaving of shawls is a typical industry of Kashmir. Carpet-making is carried on in many parts of India, but especially in the Punjab, Kashmir, and the Central Provinces. Coarse blankets are made in many parts of Northern India, where the winters are cold.

In the cotton, silk, and woollen industries native vegetable dyes such as indigo were formerly used, but now cheap artificial dyes are imported.

Metal Working. Ironworking is another old industry of India, but until recently the great Tata iron and steel works were the chief modern ironworks. Many castes in India use brass for all cooking

utensils, and brass-working is an important industry in many towns of Northern India, such as Benares. Bombay and Poona are centres of silver-working; Jaipur and Delhi of gold-working.

Pottery. The making of pottery for domestic purposes is a native or "cottage" industry all over India. Bricks and tiles are made all over Northern India.

Other Manufactures. There are numerous rice-mills in Bengal; wheat-flour mills in the Punjab; saw-mills in Assam; oil refineries in Assam and the Punjab; tobacco factories in Madras; sugar-mills in the northern plain. In Southern India the rubber industry is important, and in Assam tea-packing.

The Cities and Towns of India. Although nine persons out of every ten live in small villages or isolated huts, with a vast population of 400,000,000 people, there are naturally a number of large towns. We may distinguish:

(a) The four great ports—Calcutta, Bombay, Karachi, and Madras.

(b) The famous old cities of the past, many of them founded thousands of years ago, and full of fine old buildings. Some, like the great capital of India, Delhi, are still flourishing; others are growing but slowly.

(c) Cities of modern growth, depending usually on manufactures or the presence of railways.

The Great Ports. *Bombay* has a fine large natural harbour. Being built on an island there is great congestion in the town, for there is little room for expansion. Notice the gaps in the hills through which the railways from Bombay pass inland to its fertile hinterland. It is from the plateau region behind that Bombay gets most of the raw cotton for its numerous cotton-mills.

Calcutta is the largest city in India, and the second largest (after London) in the Commonwealth. A hundred and fifty years ago the site of Calcutta was an unhealthy swamp; it has grown to greatness by the labour of man and under the activities of the Government of India. Although 70 miles from the sea on the River Hooghly, it can be reached by large ocean steamers, and it is well situated to receive the products of a vast hinterland—the whole of the Ganges Valley. On the opposite side of the River Hooghly is Howrah, which really forms part of Calcutta, and which is connected by rail with nearly all parts of India.

Karachi is the chief port as well as the capital of Pakistan. Although its harbour is largely artificial it is the natural outlet of the Punjab and is rapidly growing. Notice the railways from Karachi. It exports oilseeds, wool and rice, and was formerly the great wheat port of India, exporting the wheat of the Punjab and also large quantities of cotton. The climate is dry and for the

establishment of cotton-mills such as exist at Bombay humidifiers are needed.

Madras has the only good harbour on the east coast—it is entirely artificial. Madras is the third largest city and the fourth most important port in India, but its trade is a long way behind that of Karachi. There are cotton-mills in Madras, and both cotton goods and raw cotton are exported. The tanning of hides and export of leather also belong to Madras. Farther north along the east coast *Vizagapatam* was provided with a harbour at great cost. South of Madras are the ports of *Tuticorin*, *Calicut*, and the ferry port for Ceylon, *Dhanushkodi*. On the west coast the once shallow lagoon has been dredged to make *Cochin* a fine harbour.

Inland Cities and Towns. *Delhi*, the capital of India, lies between the Punjab Plain and the Ganges Plain. The district around has

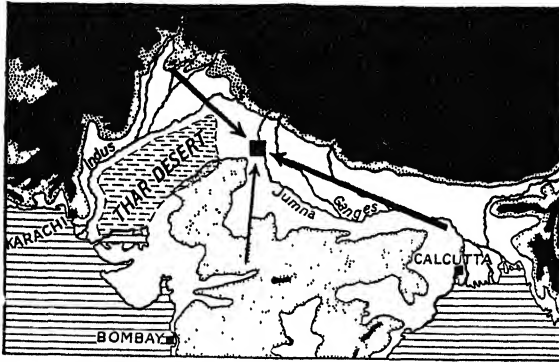


FIG. 218.—The position of Delhi.

Land over 1,000 feet, dotted; land over 3,000 feet, black.

been constituted a small province, separate from the Punjab and the United Provinces. Delhi is a large city of 1,750,000 inhabitants; it owes its importance largely to its position. From Delhi any place in the plain, either of the Ganges or Indus, is easily reached. In days gone by, when India was invaded from the north-west, the invaders had to pass near Delhi, because they were shut in by the Himalaya Mountains on the north and the desert on the south. In the old days the land routes of the north-west joined the water routes down the Jumna and Ganges. In modern days Delhi has become a railway centre. The cotton of the surrounding irrigated lands finds its way to the cotton-mills of Delhi. At a convenient distance to the north are the healthy heights of the Himalayas, on a spur of which Simla has been built.

Starting from Delhi, we will review the more important places as one goes down the broad Ganges Valley towards Calcutta. On

the river Jumna lies Agra, formerly one of the great cities of the Mogul Empire and famous for the Taj Mahal, perhaps the finest building in India. In the Ganges-Jumna Doab lie collecting and distributing centres, amongst which Aligarh is noteworthy as having a dairying industry. Cawnpore, on the Ganges, has become a railway centre and has developed modern factories. Lucknow has long been famous for its gold and silver ware. Allahabad, on the confluence of the Ganges and Jumna, is the provincial capital, a place of pilgrimage, a railway junction, and manufacturing town.

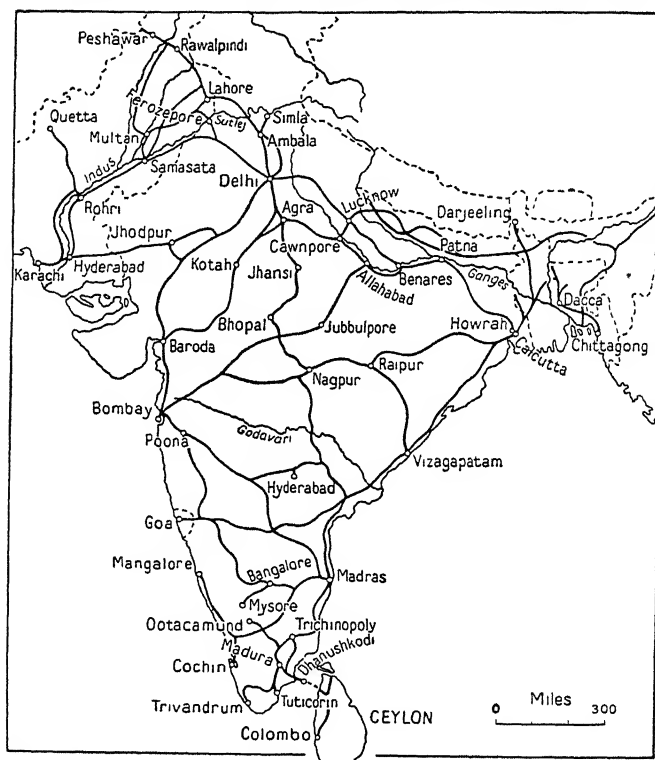


FIG. 219.—Railway map of India.

Benares is the old seat of learning and the most sacred city of the Hindus—now called Banaras. Capital of Bihar is Patna, which has given its name to a certain excellent quality rice. In West Bengal (India) there are several large jute-mill towns on the Hooghly, north of Calcutta. On the border of Bengal and Bihar are the coalfield centres such as Asansol. In East Bengal (Pakistan) is the old city of Dacca, which is again flourishing. On the healthy heights of the Himalayas to the north of Bengal lies the hill station of Darjeeling.

Returning now to Delhi and going westwards into East Punjab (India) we find the Sikh city of Amritsar, again growing. In West Punjab (Pakistan) is Lahore. Rawalpindi guards the main route into Kashmir to the town of Srinagar. Peshawar guards the Khyber Pass route and is the centre of the irrigated Vale of Peshawar and principal city of the North-West Frontier Province. Multan is the central town for the very dry south-west Punjab. The fortress of Quetta guards the Bolan Pass.

In Peninsular India, Jubbulpore and Nagpur are two important centres, both with cotton-mills. Farther south, Hyderabad is the chief town of the state of that name. Bangalore and Mysore are the chief towns of Mysore. In Madras, Ootacamund is the hill station for southern India. Trichinopoly and Madura are two old cities.

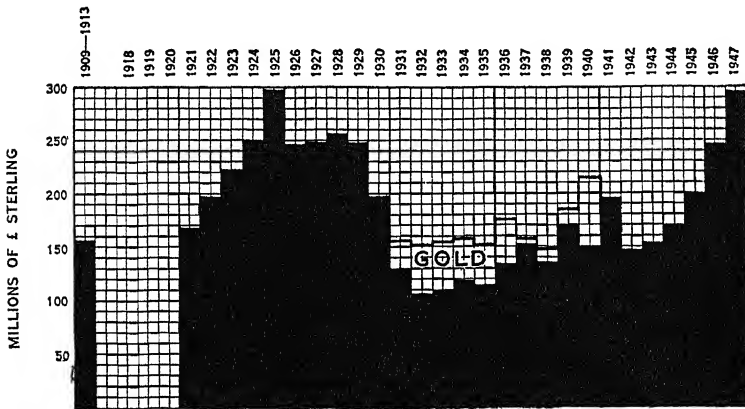


FIG. 220.—The exports of India—merchandise, bullion, and specie.

The rupee is standardized at 1s. 6d. Trade is stated in "crores" of rupees. A crore is 10 million, written 1,00,00,000. This diagram has been taken to 1947—the year of partition.

The Communications of India. Railways. By far the most important means of communication in India is the railway. India has now 43,000 miles of railway. There are two principal gauges:

(a) The broad gauge, 5 feet 6 inches, including all the more important lines and more than half the railways of India.

(b) The metre gauge, 3 feet 3½ inches, used mainly, but by no means entirely, for branch lines.

Some of the hill railways are on a still smaller gauge. Most of the important railways of India run from the chief ports to different parts of their hinterlands, and it is simplest to study the railways by taking each of the great ports in turn. Follow these on the map, Fig. 219.

There are four main railways radiating from Calcutta and Howrah;

four main lines radiate from Bombay; Karachi really has only one railway, which runs to Hyderabad. From Hyderabad there are two main lines, one to Delhi, the other up the Indus Valley to the Punjab. Four main lines radiate from Madras.

Apart from these main lines, shown on Fig. 219, there are large numbers of branch lines in all the more thickly populated parts of India. There is at present no railway connecting India and Burma, and no railway connecting India with any other country except just over the border into Persia.

Roads. When compared with other civilized countries, India still has few metalled roads. There are a few "trunk roads," such as the one from Calcutta to Peshawar, which were commenced before the

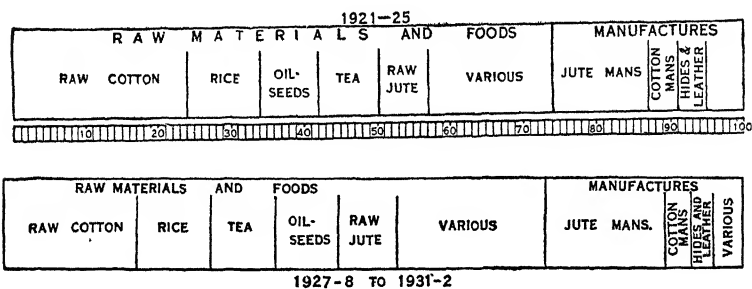


FIG. 221.—The exports of India.

This diagram refers to the old Indian Empire, with Burma, and should be compared with Fig. 224.

days of railways, but most have been called into being by the growth of motor transport, especially motor buses. Most large towns are now linked by motorable roads and great progress was made during the Second World War.

Rivers. The rivers are much less important than formerly, owing to the growth of the railways and the use of river water for irrigation. The largest system of river transport is found on the River Ganges and branches below Patna. Except for the Calcutta and Eastern Canals and those of the south-west coast, the canals of India are little used for transport; they are for irrigation.

Airways. India now makes great use of air transport both internationally and within the country. London can be reached in a day from Karachi or even from Delhi.

The Foreign Trade of India. Owing to the mountain wall which forms the landward frontier of India, most of her foreign trade is sea-borne. Although India has a large foreign trade it is small when compared with the vast population—less than 30s. per head of population. Figs. 221 and 223 show the principal items of import and export in the

inter-war years before the separation of India and Pakistan. Fig. 224 shows the trade of India after separation. Previously the imports included a huge proportion of gold and silver. The poorer classes in India have not yet learnt to appreciate and use savings banks, and what wealth they have is in the form of gold and silver ornaments. Much of the gold is from the Transvaal. But after 1931 there was a huge export of gold, the Indians selling their treasure for rupees. Later this trend was reversed. In a hot country like India all the clothing

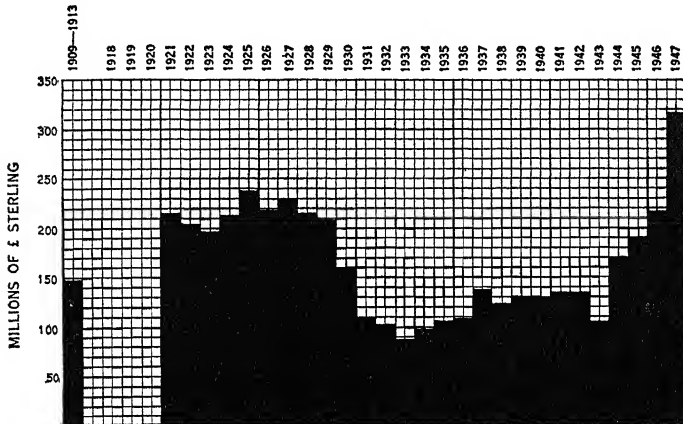


FIG. 222.—The imports of India (including gold and silver).

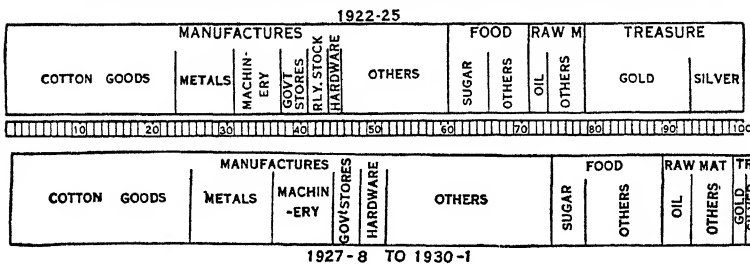


FIG. 223.—The imports of India.

This diagram also refers to the old Indian Empire and should be compared with Fig. 224.

absolutely necessary can consist of cotton garments, hence the former large import of cotton manufactures—mainly from England and Japan. The position has now changed as shown in Fig. 224. It should be noticed that India formerly did not grow nearly enough sugar for her requirements. Amongst the exports the cotton goods are exported almost entirely from Bombay; the jute and tea from Calcutta. The exports of Pakistan apart from raw jute sent from eastern Bengal to the mills along the Hooghly are mainly from Karachi—a surplus of raw cotton and sometimes foodstuffs.

natural regions, the Himalayan Region and the Sub-Himalayan or Sub-Montane region.

The **Himalayan Region** can be divided into four belts, according to vegetation and height above sea-level:

- (1) Evergreen Oak Forest Belt, 5,000 to 9,000 feet.
- (2) Coniferous Forest Belt, 9,000 to 12,000 feet.
- (3) Alpine Belt, 12,000 to 16,000 feet.
- (4) Snow, 16,000 feet to the top of the mountains.

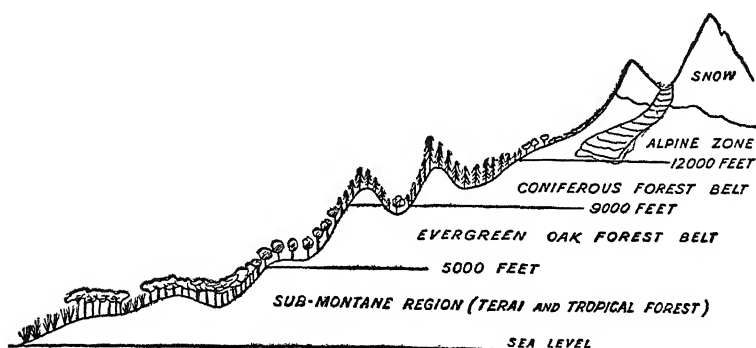


FIG. 227.—Vegetation zones of the Eastern Himalayas.

Although the forests are dense and contain many different trees, they are too inaccessible to be of great commercial value at present.

The **Sub-Montane** or **Sub-Himalayan Region** lies between the broad cultivated plains of the Ganges and the Himalayan Region, extending to a height of 5,000 feet in the Himalayas. It can usually be divided into two strips:

(a) The part nearer the plains, often built up of sand and stones washed down from the hills, is only slightly above the level of the plains. It is often covered with coarse tall grasses, and is known as the Terai.

(b) The part nearer the mountains consists of a belt of hills, usually covered with forest, damp and unhealthy. There are large areas of valuable sal forest.

Cultivation is gradually extending into the Terai, which is being drained, cultivated, and rendered more healthy, and so the population increases.

The principal town of Nepal, Katmandu, is situated in a rich valley amongst the hills. Nearly a quarter of all the inhabitants of Nepal live in this valley.

Nearly all the exports and imports of the kingdom of Nepal pass

through India. A large part of the foreign trade passing the land frontiers of India is with Nepal.

KASHMIR

Kashmir is a large native state, situated amongst the mountains of north-western India. Formerly ruled by the Maharaja of Kashmir and Jammu, with Srinagar as capital, it was proclaimed a republic in 1952.

When Pakistan and India became separate countries in 1947. Kashmir was claimed by both. The people are largely Mohammedans like those of Pakistan, but the ruling class is Hindu. The country is important to Pakistan as the source of the rivers supplying irrigation water.

The greater part of Kashmir lies in the Himalayan region, but the whole country is much drier than Nepal. The north-eastern corner of the state lies on the Tibetan Plateau, whilst the south forms part of the Sub-Himalayan region. By far the most important part of the state is the small but beautiful Vale of Kashmir, through which flows the Jhelum River, there navigable.

PAKISTAN

It has already been explained that Pakistan set up in 1947 consists of two parts. Western Pakistan is shown in Fig. 228 and comprises the former Baluchistan, Sind, North-West Frontier Province and the larger western part of the former Punjab Province. These divisions were abolished in 1955.

BALUCHISTAN

Baluchistan lies outside the mountain wall of India and outside the influence of the monsoon, and is a very dry plateau. It includes several settled Districts (the most fertile parts), the large state of Kalat and a number of smaller states. In this barren country there are only six people per square mile—less than in any other Province or major State of India. The people are nearly all nomads, moving about with their herds of sheep, goats, horses, cattle, and camels. In summer they live in shelters made of branches, or in tents made of goats' hair matting. In winter they live in mud huts in villages. A little land is irrigated by the curious "karez" or by flood waters from the rivers. The principal crops are millet, wheat, and fodder. Along the sea-coast there are a few fishermen, but a little way away from the coast dates provide food for man and beast for most of the year. There are really no towns in Baluchistan except Quetta. The Bolan Pass is the easiest route from Baluchistan to India, and the modern town of Quetta lies at the head of the pass. There is a military station at Sibi. Across the deserts are

numbers of old camel caravan routes. One of these, running along the north of the country to the Persian border, has been replaced by a railway.

THE NORTH-WEST FRONTIER PROVINCE

The North-West Frontier Province was one of the smaller provinces of Pakistan, and lies mainly between the Punjab and the Afghan



FIG. 228.—West Pakistan.

The new capital is to be near Rawalpindi.

frontier on the western side of the Indus. It consists of three settled Districts and a large tract of "tribal territory" lying between them and the frontier. The tribal territory is inhabited by wild hill tribes who are left to themselves unless they become restless and attempt to raid the people on the plain.

Everywhere the rainfall is small and nowhere exceeds 30 inches. The tract on the west of the Indus consists of a series of three plains—Peshawar, Bannu, and Dera Ismail Khan—divided from one another by the low hills of Kohat and offshoots of the frontier range. The Indus Valley itself is a fine tract, but the harvests vary greatly with the extent of river floods. The Vale of Peshawar is highly irrigated and well wooded. Where irrigated the Bannu Plain is fertile, but elsewhere is dry and barren. The plain of Dera Ismail Khan is a clay desert, but in good rainfall years becomes grass covered. These plains have very hot summers and very cold winters. To the west of the three plains lie the barren treeless hills inhabited by the wild frontier tribes. In the more sheltered valleys are little villages, and near by the hill-slopes may have sufficient grass for sheep to be kept. The region is almost outside the influence of the monsoon and most of the scanty rain falls in the cold season. The irrigated plains of Peshawar and Bannu are thickly populated and much wheat is grown. Another crop is gram. Millet is grown as a dry crop.

Above Peshawar lies the famous Khyber Pass, the gateway to Afghanistan. A wonderful mountain railway now threads its way through the narrow pass. Peshawar is the most important town of the province, it is the centre of the irrigated land, and controls the Khyber Pass routes.

WEST PUNJAB

Although it lies in the dry north-west, the West Punjab is a very important part of Pakistan. The former Province of the Punjab benefited enormously by the great irrigation works carried out by the British Indian Government. Punjab means "five waters" and the Punjab is, strictly, the land of the five rivers—the Jhelum, Chenab, Ravi, Bias, and Sutlej.

The greater part of West Punjab forms part of the great plain of northern India. In the north-west is a dry plateau or hilly region. The most important crop there is millet, which depends mainly on the scanty rainfall. There are two oilfields near Attock, and salt is mined in the Salt Range. The principal town is Rawalpindi, at the foot of the Himalayas, from which a road runs to the hill station of Murree and to the heart of Kashmir.

The Punjab Plain is a broad alluvial plain without a hill at all. It slopes almost imperceptibly south-westwards. South of the Sutlej the land rises gradually and fades away into the Thar Desert. The five rivers thread their way across the plain—Jhelum, Chenab, Ravi, Bias, and Sutlej. Eventually they all join to form the Panchnad, which in turn joins the Indus. In the dry season the rivers are shallow and slow, but in the rainy season, when the warm sun has melted the snows on the Himalayas and the monsoon rains are pouring down on the Himalayan slopes, the rivers become

rushing torrents often miles wide. The rush of water does not always follow the same channel. The river may leave its old bed and in a single night destroy miles of fertile fields. The whole region is very dry; it is driest in the south-west, where the rainfall is less than 5 inches. The extremes of temperature between the hottest and coldest months should be noted.

The North-Eastern Plain of Fig. 229 is the wettest part—near the foot of the Himalayas. There are numerous wells for irrigation in this region, but dry crops may also be grown without irrigation.

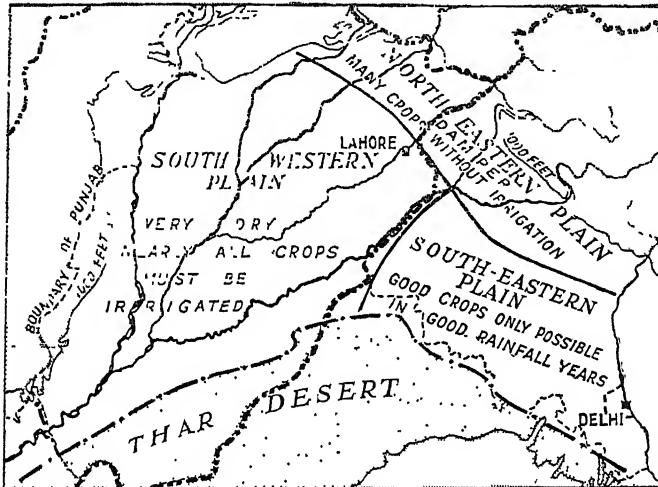


FIG. 229.—The three divisions of the Punjab Plain.
Showing the boundary between East Punjab and West Punjab.

The South-Western Plain is so dry (5–10 inches) that it is practically impossible to grow anything without irrigation.

In the Punjab plains as a whole more than half the crops depend upon irrigation. There are six important systems of Government Canals, but some have been cut by the boundary between Pakistan and India.

- (1) The Western Jumna Canal takes its water from the River Jumna near where it leaves the mountains and waters the south-east of the plain.
- (2) The Sirhind Canal is an old system taking its water from the Sutlej River and also watering the south-eastern plain.
- (3) The Upper Bari Doab Canal takes its water from the Ravi River, where the Ravi leaves the mountains.

(4) The Lower Chenab Canal is one of the largest of the irrigation works in India. A great weir was built across the River Chenab at Khamki.

(5) The Lower Jhelum Canal takes its water from the Jhelum.

(6) The Triple Project or Upper Chenab-Lower Bari Doab Canal System is one of the cleverest examples of canal irrigation that exists. The Upper Chenab Canal takes its water from the Chenab at Merala, near the foot of the Himalayas. The main canal is carried across the Ravi River by an aqueduct or "water bridge" and then becomes the Lower Bari Doab Canal. But

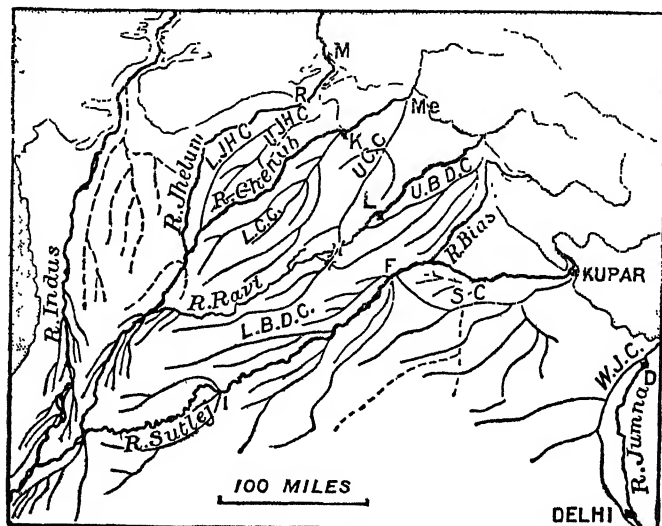


FIG. 230.—The Punjab canals.

Compare this with Fig. 229 and notice how the Pakistan-India border cuts right across important canal systems.

when this scheme was arranged it was found that so much water would be taken by the Upper Chenab Canal that none would be left for the Lower Chenab Canal. And so the Upper Jhelum Canal was built to bring water from the Jhelum to the Chenab at Khamki to help fill the Lower Chenab Canal.

Special attention is now being paid to the irrigation of the Thal between the Indus and Jhelum.

Clearly the control of the headwaters of the rivers is very important to Pakistan. It has been the reason for certain difficulties between Pakistan and the Indian Republic.

As a result of irrigation many parts of the Punjab are "double cropped." Wheat, the most important crop, covers nearly a third of the area. It is reaped in spring; millet is often grown on the same ground and reaped in autumn. Wheat and millet, together

with maize, form the staple food of the people. An excess of wheat used to be available for export and was sent to Europe through the port of Karachi. Another crop is barley. Oil-seeds are grown, also partly for export. By far the most important crop not grown for food is cotton. On the irrigated land the long-stapled American cotton is grown and exported through Karachi. The Punjab being a dry region, much fodder is grown to feed the cattle used in ploughing.

The majority of the people are engaged in agriculture. In the old days the cultivators suffered severely from raids of war-like tribes of the hills, and so lived together in villages for protection. They still live together in small villages scattered over the plains. The huts are of mud or mud and wattle, and the roofs of the huts are flat, for there is little rain to run off. There are very few large towns.

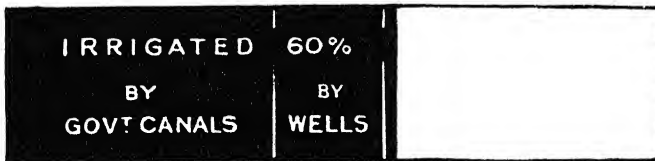


FIG. 231.—Proportion of crops irrigated in the Punjab.

By contrast with India, Pakistan normally has a surplus of food-stuffs and raw materials. In years of bad harvests, however, wheat may have to be imported.

Lahore is an old historic city and is now the centre of government of West Punjab (Pakistan). It forms one of the collecting centres for the rich northern parts of the plain. *Multan* is the natural centre of the dry south-western plain. Much of the trade to Karachi passes through Multan, which has long been a busy market-town. Afghan traders visit the town and exchange their spices and fruits for piece goods.

Gujranwala is another centre in the northern part of the plain.

SIND

Sind consists of a broad, dry alluvial plain stretching from the edge of the Baluchistan Plateau on the west to the Thar Desert on the east. Running from north to south through the centre is its life and soul—the Indus River. Just as Egypt is the gift of the Nile, so Sind is the gift of the Indus. In the past, irrigation in Sind has been by “inundation canals,” which are only filled with water when the river is in flood, and which dry up in the hot weather. But in 1932 a great dam was completed at Sukkur, in the north of Sind,

and the country is now irrigated by perennial canals. The Sukkur or Lloyd Barrage Scheme is one of the largest works for irrigation ever attempted. Away from the irrigated land Sind is a lonely, barren desert.

Practically no "wet" crops are grown in Sind. On the irrigated land wheat, millet, and cotton are the leading crops.

The largest town in Sind is *Karachi*, capital and chief port of Pakistan. Another important town is *Hyderabad*, near the head of the delta.

EAST BENGAL (PAKISTAN)

Nearly the whole of the former province of Bengal belongs to one natural region—the Lower Ganges Valley or Deltas Region—consisting of the deltas of those mighty rivers, the Ganges and Brahmaputra. In the east the Lushai Hills and the small state of Hill Tippera belong to the Eastern Hills Region. But by far the greater part of East Bengal belongs to the Deltas Region. For thousands of square miles there is not a hill or even a rock; the soil is everywhere a fine silt (alluvium) and not a stone is to be found. The region is practically flat; the rise from the sea towards the north is so gradual that it cannot be seen. Owing to the heavy rainfall—nearly everywhere over 60 inches—the country is always green and does not get dried up and brown like the Upper Ganges Valley.

The region may be divided into three parts:

(a) *The Ganges-Brahmaputra Doab*, in the north, sloping gradually from the Sub-Himalayan Region in the north towards the Ganges. There are numerous silted-up river channels, and even now the rivers frequently change their courses. The usual flat surface is broken by a stretch of low hills called the Barind, covered by the remains of a former forest.

(b) *The Old Delta*, in the centre and west. The great delta of the Ganges and Brahmaputra has moved gradually to the east, and central Bengal is now a land of dead and dying rivers. The places of river channels which used to carry water from the Ganges to the sea is now often taken by large swamps or "bils." Many of the bils have been drained and form valuable rice-land. Near the sea are the Sundarbans—great swamp forests. A part of this old delta country lies in Pakistan but most in West Bengal (India).

(c) *The New Delta*, in the east. Here the great rivers are still actively building up their deltas, and every year huge quantities of silt are brought down by the Ganges and the Brahmaputra. In the high-water season a great part of the area is flooded, and a rich deposit of silt is spread over the country. In this region, the true delta, there are few or no roads; bullock-carts are useless,

and nearly all travelling is done by boats. Closely connected with this region is the Surma Valley, formerly part of the Province of Assam. The houses in the delta are built on mounds to prevent them from being flooded in the rains. Although so wet, this is a densely populated country and produces enormous quantities of rice and jute. In the north is a slight ridge, the Madhupur jungle. Although insignificant, this ridge has been sufficient to prevent the great rivers moving still farther eastwards.

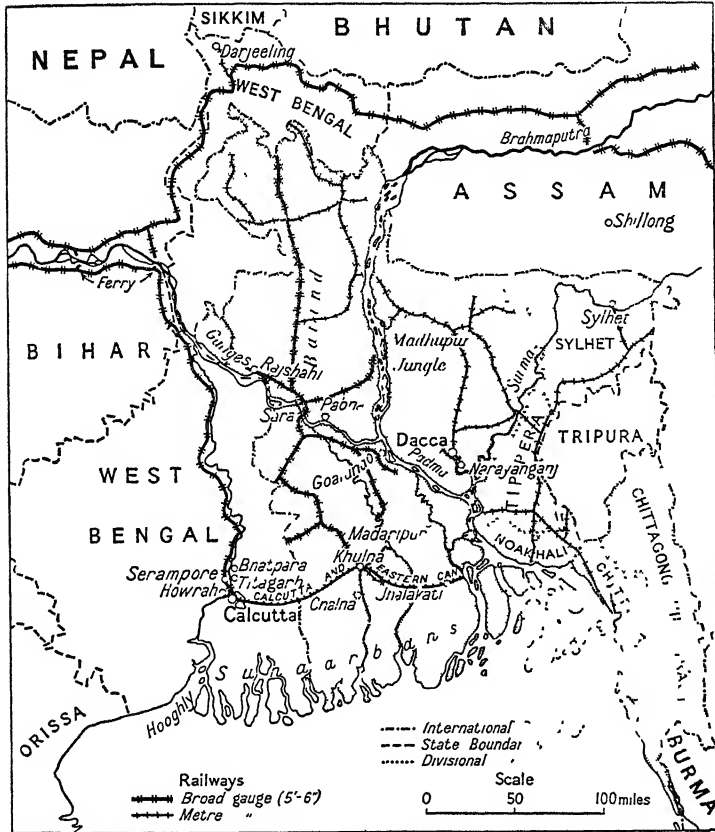


FIG. 232.—East Pakistan.

If we look at the uses to which the land is put we find 6 per cent. is covered with forests. These are the Sundarbans, and they furnish firewood for the numerous towns. Nearly a quarter of the region is covered by bils, swamps, rivers, etc., and cannot be used. There is about 11 per cent. of waste land, mainly in the Barind and Madhupur Jungle. That leaves well over half the land which is cultivated. Look at Fig. 235, and notice that by far the most important crop

is rice covering three-quarters of the cultivated land. Jute is another important crop. The dry-zone crops—wheat, barley, millet, maize, etc.—have all entirely disappeared.

Nearly all the people in this region speak Bengali. Three-quarters of them are cultivators and live, not in villages, but in small houses or huts on mounds in the midst of their fields. They have not the same fear of fierce invaders as the people of the Punjab Plains, who in times past were forced to live together in villages for protection.

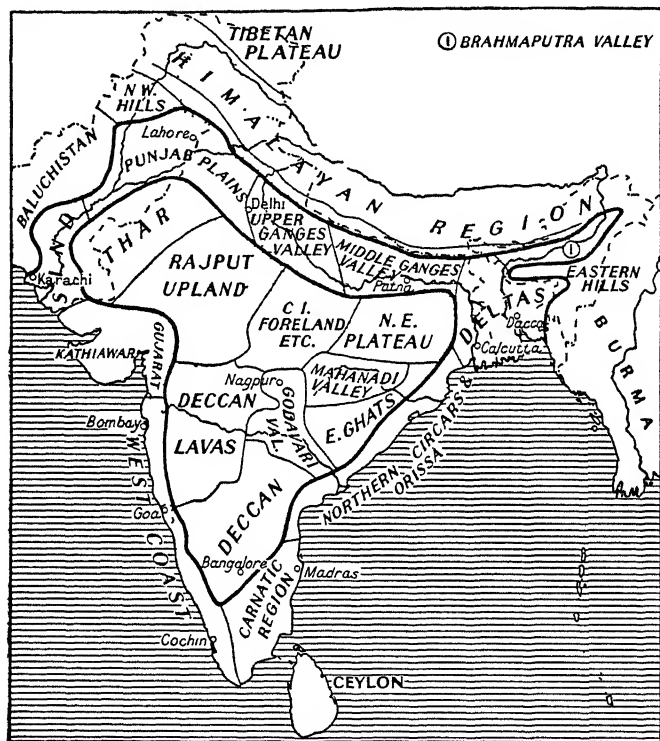


FIG. 233.—The natural regions of India.

Dacca is the capital of East Bengal (Pakistan), and is the centre of the rich lands of the New Delta. Unlike Calcutta, it was an important city 300 years ago. *Jhalakati* is a trade centre of Eastern Bengal, and the centre of the betel-nut trade. *Narayanganj* (a river port) and *Madaripur* are other collecting centres. *Goalundo* is another river port. *Sylhet* is the centre of the Surma Valley. Notice the succession of canals—the Calcutta and Eastern Canals—by which rice and jute can be sent by water direct from Eastern

Bengal to the mills on the Hooghly. The jute and rice producing regions are now in Pakistan but the mill-towns are in India. Recently there has been much activity in stimulating jute-growing in India.

THE REPUBLIC OF INDIA

When the Republic of India was established, the First Schedule to the Constitution arranged the states and territories of India into four groups.

The first group comprised nine units, roughly the former provinces of British India—Assam, Bihar, Bombay, Madhya Pradesh (Central Provinces and Bihar), Madras, Orissa, East Punjab, United Provinces (Uttar Pradesh) and West Bengal. The second group comprised eight important former native states or groups of states. Later amalgamations took place and the old princely states vanished.

In 1956 the states of Peninsular India were realigned so that there were 13 in all (excluding Kashmir) but at the end of 1959 it was agreed to divide Bombay into two. There are also six territories, including Delhi.

ASSAM

There is still plenty of room for more people in many parts of Assam. The seat of Government is Shillong, situated on the high healthy plateau but not served by railway.

Physical Features. Assam falls into three separate divisions:

(a) Part of the Himalayas in the north—adjoining the separate state of Bhutan. This constitutes the North East Frontier Agency, much of which is claimed by China.

(b) The Brahmaputra Valley.

(c) The Hills Region, consisting of the hills which separate Assam from Burma, and sending a broad finger westwards to form the Khasi, Jaintia, and Garo Hills.

The Brahmaputra Valley in Assam is roughly 500 miles long, but only about 50 miles wide, and so is very different from the broad Ganges Plain. It is shut in between the lofty Himalayas on the north and the Assam Hills on the south. A great part of the valley has a rainfall of more than 80 inches, but in the centre there is a drier patch. This drier part lies in the rain-shadow of the Garo, Khasi, and Jaintia Hills, which protect the valley from the south-west monsoon. In the hot season and the rains the sky is cloudy, and the land does not get so hot as in the broad Ganges Valley. The Brahmaputra River itself is broad; it divides and reunites again many times; on either side there is often a waste marshy belt, but a little distance from the river are flat lands given over to rice-growing. Palm trees and villages are dotted about amongst

the paddy fields; farther away from the river we find the gentle slopes covered with tea gardens for which Assam is famous. There are still only 150 people to the square mile in this region, instead of 500 as we find in the Ganges Valley. Less than a quarter of the region is cultivated, whilst nearly half is waste land. Every year Bengalis come from crowded Bengal to settle; Biharis are employed in the tea gardens, and afterwards settle on the land, and so the population is growing. Two-thirds of the cultivated land is used for rice; tea and oil-seeds are the other important crops. Twelve people out of every hundred are connected with the tea industry. Remember that the tea is grown mainly for export. At the eastern end of the region is the small oilfield of Digboi. The river is the great highway; notice how it interrupts the railways.

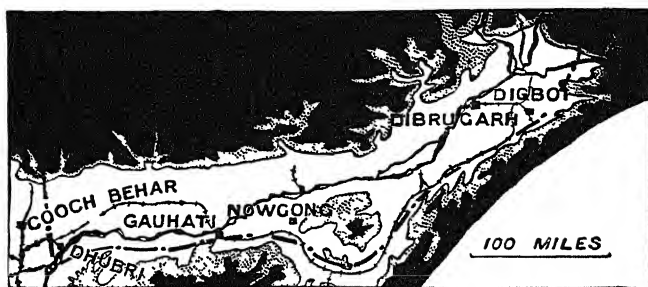


FIG. 234.—The Brahmaputra Valley.

The Hills Region of Assam forms part of the mountain wall between India and Burma. The hills receive a very heavy rainfall, and on the southward slope of the Khasi Hills is Cherrapunji, one of the rainiest places in the world, with nearly 500 inches of rain per year. The most important part of the region is the plateau on which Shillong is situated, and here there is a moderate amount of cultivation. Taking the region as a whole, only one twenty-fifth is cultivated, more than half is waste, and forests cover one-eighth of the whole. Many of the forests are too difficult to reach to be of value, but good sal forests are found on the Garo Hills. The wilder parts of the region are inhabited by various hill tribes, but the more fertile parts of the Garo and Khasi Hills are being cultivated by settlers from Bihar and Bengal. There is a motor road from Gauhati on the Brahmaputra to Shillong—a road which has been extended to Sylhet—and another road from Dimapur into Manipur State.

WEST BENGAL

This province of India comprises roughly the western third of the former province of Bengal, together with a tract in the north (Fig. 232) which extends across the foothill-belt of the Terai to the Himalayan

area and around Darjeeling. West of the Hooghly River the level of the land gradually rises and the soil becomes poorer and harder, and the plain passes into undulating ground on the borders of the Chota Nagpur Plateau. Outside Calcutta there are really no large cities or towns. The jute-mill and rice-mill towns, such as *Bhatpara*, *Titagarh*, and *Serampore*, are mainly on the River Hooghly.

BIHAR

The province falls very easily into two natural regions. These regions are (1) The Middle Ganges Valley; (2) The Chota Nagpur Plateau.

The Middle Ganges Valley. This part of the Middle Ganges Valley is a little damper than the part lying in the United Provinces. Fig. 235 shows clearly the difference between the crops of this region and those of the Upper Ganges Valley. The inhabitants are the Biharis, who do not live in villages, but in small houses in the midst of their fields. The pressure on the land is so great that every year large numbers of Biharis go to work in the tea plantations of Assam, or on the docks of Calcutta.

Patna is the seat of provincial government and a large collecting station. It has given its name to Patna rice, a very fine kind of rice. It is on the south of the Ganges, and so connected directly with Calcutta by railway. Patna lies also just below the junction of three important tributaries of the Ganges—the Son, Gandak, and Gogra. *Monghyr* is a famous old town also on the southern bank of the Ganges; *Bhagalpur* is another town on the Ganges, farther east. Then there are several important towns which serve as collecting and distributing centres for the rich plains north of the Ganges. Examples are *Darbhanga*, *Muzuffarpur*, and *Purnea*. In the north the Province of Bihar borders Nepal and includes a small strip of the Terai country, described under Nepal.

The Chota Nagpur Plateau forms the north-eastern corner of the great plateau of Peninsular India. It is thinly populated and includes some of the wildest parts of India. In the depths of the forests are primitive tribes, such as the Santals, who still use bows and arrows and wear no clothes. An important industry is the collection of lac from the trees. The plateau consists mainly of old hard rocks; in the north there are mica mines, in Singhbhum iron and copper ores are obtained. On the borders of the plateau are tracts of coal-bearing sedimentary rocks, and it is on the borders of Bihar and Bengal that the most important coalfields of India are found. The coalfields of Jharia, Raniganj, and Giridih produce over 30,000,000 tons a year, or nine-tenths of all the coal of India. The great modern iron and steel town of Jamshedpur is in this area. There is a smaller field at Daltonganj in the north. The important

towns are the coalfield towns, including the railway centre of Asansol. On the plateau is Ranchi, the old hot-weather capital of the Province.

An important river drains part of the plateau eastwards towards Bengal. This is the Damodar, and it is believed much could be done to develop the lands in its valley. Consequently a Damodar Valley Authority, modelled on the American Tennessee Valley Authority, has been set up. Amongst other things, fertilizers are to be manufactured, floods are to be controlled, and irrigation developed.

GANGES VALLEY

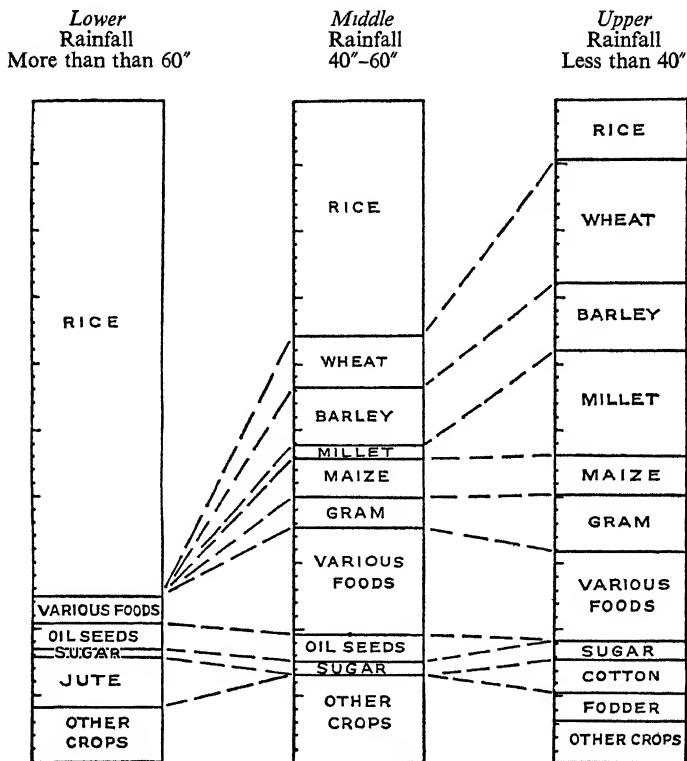


FIG. 235.—The crops of the Ganges Valley.

ORISSA

Orissa forms part of the coast region of the northern part of the east coast—the Northern Circars Region. Along the coast itself are useless sand-dunes or mangrove swamps, behind which are

fertile paddy lands. Farther inland are low tree-covered hills, and fertile valleys. Two-thirds of this fertile and thickly populated region are cultivated, and rice occupies more than four-fifths of the cultivated land. The chief towns are *Puri*, a famous place of pilgrimage, and a seaside resort; *Cuttack*, an old capital of the kings of Orissa; and *Balasore*, once an important port with English, French, and Dutch factories, but now little used.

The northern part of the province embraces part of the Chota Nagpur Plateau.

UTTAR PRADESH (formerly THE UNITED PROVINCES)

The United Provinces of Agra and Oudh have a denser population than any province of India or Pakistan except East and West Bengal. Yet a large part of the United Provinces has a rainfall of less than 40 inches, and their prosperity is largely due to the great irrigation works. The north-western part of the United Provinces stretches into the Himalayan and Sub-Himalayan Regions (compare the Punjab), and a small strip along the south forms part of the Central Indian Plateau. But the largest part of the Province lies in the great Ganges Plain. The area west of Allahabad receives less than 40 inches of rain in a year, and so forms a natural region which we may call the Upper Ganges Valley or Dry Belt. The region east of Allahabad forms half of the Middle Ganges Valley, of which the other half lies in the Province of Bihar.

It is in the United Provinces that great extensions of cultivation have been made in recent years into the Sub-Himalayan Region. Dehra Dun is one of the headquarters of the Forest Department in India. A famous and sacred place is Hardwar, where the Ganges leaves the mountains. A line of towns has sprung up on the borders of this region and the Ganges Plain—like frontier towns from which the cultivators have attacked the unhealthy foothills. Examples are Saharanpur, Pilibhit, Kheri, etc.

The Upper Ganges Valley, like the Punjab Plain, is a vast plain without a hill. Running roughly through the centre from north-west to south-east is the Ganges; marking roughly its south-western border is the Jumna. The region consists, therefore, of the Ganges-Jumna Doab and a large stretch of country north-east of the Ganges. The whole plain slopes very, very gently from Delhi (700 feet above the sea) to Allahabad (400 feet). The plains are cold in the cold season, but get very hot in the hot weather, though not quite so hot as the Punjab Plains. Since the rainfall is nearly everywhere less than 40 inches, it is necessary to irrigate the land. The Ganges-Jumna Doab is especially well served by irrigation canals, and more than 50 per cent. of the crops are grown on irrigated land. In the Upper Ganges Valley there are five large canal systems:

(1) The Eastern Jumna Canal, which takes the water from the Jumna River near Faizabad, just where the river leaves the mountains.

(2) The Agra Canal, which takes the water from the Jumna River just below Delhi.

(3) The Upper Ganges Canal, which takes the water from the Ganges near Hardwar, where it comes down from the Himalayan Mountains.

(4) The Lower Ganges Canal, which takes the water from the River Ganges at Narora.

(5) The Sarda Canal, which takes the water from the River Sarda at Banbasa, was completed in 1930.

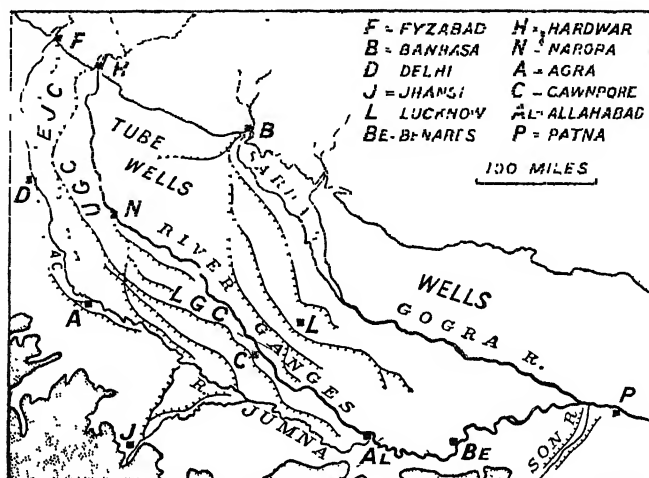


FIG. 236.—The irrigation canals of the Upper Ganges.

EJC=Eastern Jumna Canal; AC=Agra Canal; UGC=Upper Ganges Canal;
LGC=Lower Ganges Canal.

(1), (3), and (4) water the Doab; (2) waters the land south of the Jumna. North of the Ganges there is much irrigation, too, from wells including modern tube-wells, electrically pumped.

Of the whole Upper Ganges Plain more than two-thirds is cultivated, and only 15 per cent. is waste land. There are no forests at all. The most important crops are wheat, barley, and rice, all grown on irrigated land; whilst millet is the most important dry crop. Everywhere wheat is more important than rice, and in some of the western districts no rice is grown at all. Maize, gram, cotton, fodder, and sugar occupy considerable areas. The cotton grown on the irrigated land is the valuable long-stapled American cotton. Nine out of every ten people in this region are engaged in cultivation, and live in small villages in huts of mud and wattle. Only one person in ten lives in a town. Although the Upper Ganges Valley is so densely populated there are only a dozen cities with more than

100,000 people. Of the famous old towns, Lucknow, Allahabad, and Muttra are now the most important.

Lucknow is an old capital and still the largest town in the province, and now growing again. It is a railway centre. *Allahabad*, situated at the junction of the Jumna and Ganges, is an important place of pilgrimage. Now that railways have supplanted river routes, it has become a great railway junction and a collecting centre. *Muttra* is an old religious centre. *Farrukhabad*, on the Ganges, is an example of a place which used to be important owing to its situation on the great waterway, but the railways have left the town alone and it has declined in importance.

Of the more modern or progressive cities there are:

Kanpur (Cawnpore), collecting centre and railway junction, with numerous manufactures of its own; *Meerut*, *Moradabad*, *Agra*, *Bareilly*, and *Aligarh*, all of which are growing centres of rich parts of the region. Notice the railways of the region.

The Middle Ganges Valley is a natural region lying partly in the United Provinces (east of Allahabad) and partly in Bihar. It is damper than the Upper Ganges Valley, and irrigation is less necessary. The wet-region crop, rice, gradually becomes more important than wheat. When compared with the Upper Ganges Valley there is more rain and a smaller annual range of temperature. We have described the region in greater detail under Bihar. Taking the part which lies in Uttar Pradesh, *Varanasi (Banaras or Benares)*, on the Ganges, is the largest town; an ancient centre of Hindu culture and a very sacred place of pilgrimage. *Faizabad* is a neglected river port, but *Gorakhpur* is now the great collecting centre and railway centre.

Along the north this part of the United Provinces borders Nepal, and a small strip of the United Provinces really lies in the Sub-Himalayan Region. There is a line of towns along the border, from which cultivation has been extended right to the Nepal frontier.

DELHI

The capital of India and the surrounding district constitute a small separate state or province. For reasons given on p. 333 Delhi is a very natural site for a capital city. Indeed the sites can be traced of no less than five cities which preceded the two which still stand. These two are the walled city of Old Delhi with the great Red Fort and other buildings dating from the Moghul Empire and New Delhi constructed since Delhi once again became the capital of India and a monument to the British Raj. The rapid recent growth of Delhi followed.

EAST PUNJAB¹

As shown in Fig. 33 the south-eastern part of the Punjab plain

¹ The official name is Punjab (India) but it is here called East Punjab to distinguish it from West Punjab (Pakistan).

now lies in the new Indian state. The rainfall is from 20 to 30 inches but varies greatly from year to year. In good rainfall years many dry crops can be grown; in bad years none. *Amritsar*, the holy city of the Sikhs, lies near the border.

Since East Punjab now forms a separate state in the Indian Republic, a new capital is being built at Chandigarh. Much of the eastern part of the plain and neighbouring hill country was formerly occupied by numerous princely states. These were first united as the Patiala and East Punjab States Union (PEPSU) and in 1956 were incorporated in the Punjab. Leading towns are *Patiala* and *Jind*.

BOMBAY

The State of Bombay, as redefined in 1956, is now the largest in India. It stretches from the desert border with Pakistan in the north-west to the Portuguese territory of Goa in the south and far eastwards to the heart of the plateau. The language of the north is Gujarati, of the south and east Marathi: the two meet in Bombay city.¹ The Peninsular of Kathiawar was made up of a large number of small native states later united as Saurashtra and those to the north form Kutch (Cutch), whilst the important native state of Baroda was composed of several isolated tracts of country north of Bombay. It is thus obvious that the large and irregular-shaped state of Bombay will fall into a number of natural regions. We can distinguish:

- (a) Gujarat, an irregular and variable natural region.
- (b) The West Coast Region, a very wet region which lies between the Western Ghats and the sea.
- (c) The Deccan Lavas or Black Cotton Soil Region, forming part of the plateau.
- (d) Kathiawar and Kutch.

Gujarat on the whole is a lowland region, but it has numerous small hills. At the northern end it adjoins the Thar Desert and the very dry region of Sind; at the southern end it adjoins the very wet region of the west coast. So we find the climate of Gujarat varies greatly from one part to another.

Most of the important towns of Gujarat lie on the railways. *Baroda* is a large railway junction, and has modern cotton-mills. *Surat*, near the mouth of the Tapti, was once the leading port of the west coast, but its place has been taken by Bombay. *Cambay* and other towns round the Gulf of Cambay are less important than formerly. Their local industries have largely been replaced by the great cotton-mills of Bombay. *Ahmadabad* is the great collecting centre of Northern Gujarat, and is also a mill town.

The West Coast Region runs right down the western coast of India. The northern part lies in the Bombay state, the southern

¹ It was announced in November 1959 that the State would be divided into these two parts.

in Mysore and Kerala. Halfway down is the Portuguese territory of Goa. There are few bays which can be used as harbours, and only one important island, that on which Bombay stands. In the northern part of the region, it is only from Bombay that the mountain escarpment of the Western Ghats can be easily crossed. The West Coast Region really falls into three parallel strips. Near the sea are lines of sandbanks on which coconuts grow. At intervals are mangrove swamps. Behind the sandbanks are the flat alluvial lands. Everywhere the rainfall is more than 80 inches, and rice occupies half the cultivated land. Farther inland are the hill slopes covered with dense evergreen forests. Forests cover a quarter of the whole region. The many short rivers are of little use for boats, but many of them can be used for floating logs of timber from the forests. Some are already being used for generating electricity. *Bombay* is the only really large town.

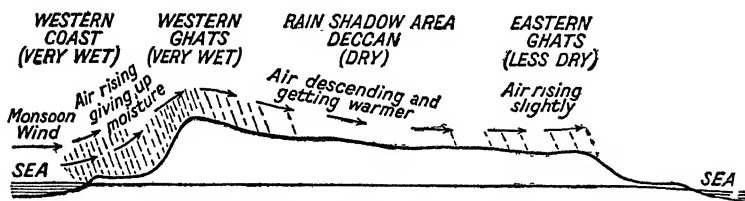


FIG. 237.—Section across the Plateau of Peninsular India.

The great city of Bombay has grown at a phenomenal rate, especially over the last hundred years, in response to India's growing foreign trade. The city occupies a narrow rocky island, the southern tip of which is still reserved for defensive purposes, which affords a magnificent protection from the South-west Monsoon to the huge natural harbour lying to the east of it. Docks and wharves line the eastern sheltered side of the island and near by have grown up the business quarter and the manufacturing area. From being devoted largely to cotton spinning and weaving, the latter now includes factories and small workshops making a great variety of goods. The city has grown too large for the island and has expanded to the north across the narrow strait which separates it from the mainland. Some distance away in this direction are great oil refineries. On the western or open sea side of the island itself land has been reclaimed and is now occupied by great blocks of residential flats, built largely since Partition. As a port it has undoubtedly benefited from its world position—the natural front door into India from both Europe and America—and the same is true of its modern function as an airport.

The Deccan Lavas Region. The north-western part of the great plateau of Peninsular India has been covered by huge sheets of lava which weathers into a dark soil, particularly suited to cotton. The great sheets of lava have only been cut through by some of the

deeper river valleys, such as that of the River Tapti. Nearly the whole of Bombay east of the Ghats lies in this natural region. It lies in the rain-shadow of the Ghats, and except along a narrow strip near the Ghats the rainfall is less than 40 inches. Forests cover a considerable area, and are found especially on the slopes of the Western Ghats. There grow teak and other valuable trees. Two-thirds of the area is cultivated, but the crops are nearly all dry

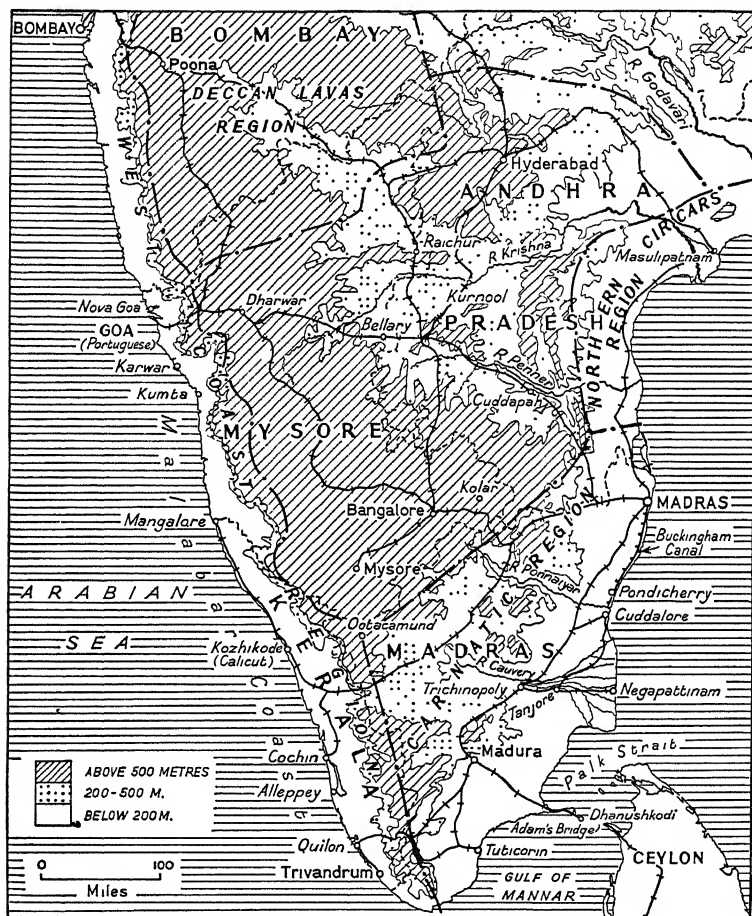


FIG. 238.—Map of Southern India.

crops since there is little flat land available for irrigation, nor are there any large permanent streams whose water could be used. The use of wheat is spreading, but the staple food grain is still millet, and millet covers nearly half the cultivated land. This is the greatest cotton-growing region of India, and nearly a quarter of the cultivated land is devoted to cotton. The short-stapled Indian cotton is grown principally. The raw cotton is sent to Bombay,

some to be exported raw some used in the mills. This drier region does not support so many people as the wetter rice-growing lands.

Poona lies near the crest of the Western Ghats and commands one of the gaps or gateways leading to Bombay. It was the hot-weather capital of Bombay state. *Sholapur* is a big centre farther south. Bombay state in 1956 was extended eastwards so as to include a large part of the former Central Provinces, with Nagpur and Wardha. The rich cotton area of Berar (centres Akola and Amraoti) lies between Nagpur and Bombay.

Kathiawar is a large peninsula suffering from a very variable rainfall. In the centre are forest-covered hills with valuable timber, but much of the country is a barren land of very little value. The people and their villages are concentrated in a few of the more fertile valleys. The towns of Kathiawar are mostly capitals of former states now grouped as Saurashtra, but also act as collecting centres for the more fertile portions of the peninsula. Many of the ports have recently enjoyed a great expansion of trade, especially Bhaunagar, which has deep-water anchorage.

CUTCH or **KUTCH** is a barren, rocky, treeless, and useless country, still drier than Kathiawar. The Rann of Cutch, once an arm of the sea, is now usually a desert. A new major port, Kandla, is being developed by the Government of India in the Gulf of Cutch.

KERALA

South of the Portuguese territory of Goa the newly defined state of Mysore now includes a section of the west coast as far south as Mangalore but from there almost to the extreme south of India lies the small but important and very densely peopled state of Kerala.

The West Coast Region in Kerala differs from the part in Bombay, because the alluvial plains between the hills and the sea are broader and there is less seasonal difference in the climate. The whole region is very wet, and can be divided, still more distinctly, into three strips:

(a) The coastal sand dunes, largely covered by coconuts.

(b) the flat alluvial land behind the sand dunes. The water of small streams from the hills is prevented from reaching the sea by the line of sand dunes, and so spreads out to form shallow lagoons. The lagoons have been connected by canals, and it is possible to travel for hundreds of miles along the west coast through these canals. Many of the lagoons are open to the sea, and some are deep enough to form harbours for native craft. One, the harbour of Cochin, has been dredged near its mouth, and now forms a harbour open to liners. The banks of the lagoons are often lined with coconut plantations, whilst every suitable piece of land is planted with paddy. Here and there are groves of the areca or betel-nut palm, and the pepper plant, for which this coast has so long been famous, is still grown.

(c) The slopes of the Western Ghats and Cardamom Hills are covered with dense evergreen forests, and forests cover nearly a quarter of the whole region.

This region is densely populated. The staple food is, of course, rice. The coconut palm is of great importance to the inhabitants. Their huts are thatched with its leaves; the wood is used for building and for firewood. The preparation of the fibre of the husks, or "coir-picking," is an important industry and the dried kernel (copra) is exported. The whole of this Malabar coast was once famous for its spices. Calicut (Malabar) and Cochin were both great spice ports: now Calicut has a small timber trade. Alleppey and Quilon are growing industrial centres where coir rope and matting are made. Kerala incorporates a number of former states, notably Travancore, the capital of which *Trivandrum*, linked by rail with Madras, has become the state Capital.

MADRAS

Once the Presidency of Madras was a very large province of India and stretched right across southern India to the west coast. As redefined in 1956, the state of Madras now coincides almost exactly with the Tamil-speaking area, Tamilnad, or the Carnatic Region.

The Carnatic Region stretches from the coast of the Bay of Bengal to the crest of the Cardamom Hills, which separate it from the West Coast Region, and, farther north, to the edge of the Deccan Plateau. The Carnatic Region falls into two parts; the lowlands near the coast or Coastal Plain, and the hilly western part. The Coastal Plain consists mainly of alluvium, but the hills are of old hard rocks. The climate of this region is different from that of all other parts of India, the rainiest months being October, November, and December.

Nearly two-thirds of the coastal plain is cultivated, but rather less than a half of the hilly parts, of which a quarter is covered by forests. This part of India used to suffer greatly from famine, for the rainfall is only about 40 inches—much less in the western parts—and varies greatly from year to year. There are many "tanks," but in bad rainfall years the tanks may never be filled. The Government has now completed a number of large irrigation works in this region, but the irrigated land is not nearly so extensive as in the dry parts of the North Indian Plain. The Periyar River flows down the very wet western side of the Cardamom Hills. The water has been brought through a tunnel to the dry eastern side of the hills, and is used to irrigate the flat land round Madura. West of Madras a large trace of country is watered from the Poini, Palar, and Cheyyar rivers. A great system of canals covers the Cauvery Delta. This is one of the oldest of the large irrigation works in India.

In the coast lands rice is more important than millet, in the hills millet is more important than rice. Both are used by the people as staple foods. Everywhere a considerable area is devoted to

ground-nuts and cotton. On the sandy dunes of the coast many coconuts are grown. On the slopes of the Nilgiri Hills there are tea gardens. The most important trees of the forests are teak and sandalwood. Deposits of lignite are now being exploited in South Arcot. Along the coast salt is obtained from the sea, and there are many fishermen; but there are no inlets to serve as harbours. At the small ports steamers have to anchor a mile or more from the shore, and land their goods and passengers by small boats. *Madras* has the only good harbour along the coast—it is entirely artificial. Madras is the third largest city and the third most important port in India. As a port its trade is a long way behind Calcutta and Bombay. There are cotton-mills in Madras, and both cotton goods and raw cotton are exported. The tanning of hides and export of leather also belong to Madras. *Pondicherry* was the capital of the French possessions in India, a few isolated towns now transferred to India. *Cuddalore* and *Tuticorin* (famous for pearl fisheries) are two ports. *Madura*, *Trichinopoly*, and *Tanjore* are inland centres.

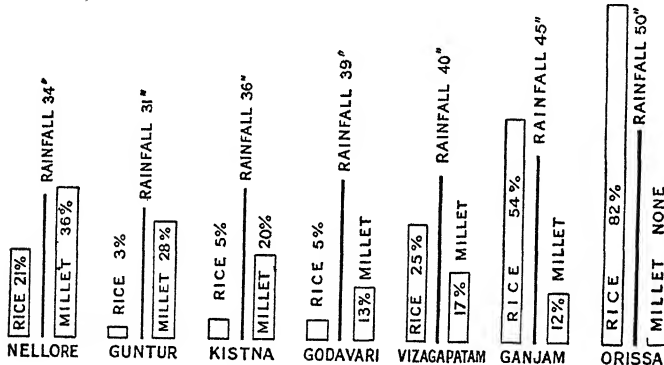


FIG. 239.—Crops and rainfall on the East Coast.

Dhanushkodi is only 22 miles from the nearest point of Ceylon. It is not really a town, but merely the terminus of the South Indian Railway; the mails to Ceylon go by this route.

Notice the railways from Madras, and the way in which they make use of natural gaps to reach the west coast. Near the coast, running north and south from Madras, is the salt water Buckingham Canal.

ANDHRA PRADESH

This important new state, the land of the Telugu language, includes a rich coastal stretch—the Northern Circars Region—and a considerable section of the plateau, the eastern half of the once mighty Nizam's dominions or Hyderabad.

The Northern Circars Region. This region lies between the crest of the Eastern Ghats and the Bay of Bengal and now forms the most important part of the State of Andhra. The central part is made up

of the large irrigated deltas of the Godavari and Kistna (Krishna) rivers. Elsewhere the region is hilly and many of the hills reach right to the coast. The flat areas are of alluvium, but the hills are of crystalline rocks. Manganese ore is obtained near Vizagapatam in the north. More than half the land is cultivated; on the damper hills there are forests. Taking the region as a whole, rice is the chief crop, followed by millet. It is interesting to notice the effect of rainfall on crops. The dry district of Guntur, with 31 inches of rain, has only 3 per cent. of rice. Northwards there is a gradual increase in rainfall and rice; wet Ganjam (now in Orissa), with 45 inches of rain, has 54 per cent. of rice.

There are few good harbours down the coast, but a big harbour scheme for *Vizagapatam* (Viskhapatnam) was completed in 1933. This town is partly sheltered behind a headland called the Dolphin's Nose. A railway has been built from Vizagapatam inland to the heart of central India. *Cocanada* (Kakinada) has a small but rich hinterland. *Masulipatam*, *Calingapatam*, and *Gopalpur* are other small ports. *Vizianagram* is a larger inland town in the north.

The Deccan Plateau. The Deccan districts of Andhra lie on the Deccan Plateau. Some of the districts were formerly in Madras Presidency, the others formed the eastern half of Hyderabad.

Hyderabad, a very large state formerly ruled by the Nizam, joined the Union in 1949. Its capital, Hyderabad, the fifth largest city in India, has been made the capital of Andhra Pradesh. The western half of Hyderabad, or Marathwara, where Marathi is spoken, forms part of the Deccan Lavas Region and is now included partly in the state of Bombay, partly in Mysore.

The eastern half of the former Hyderabad, or Telingana, where Telugu is spoken, is part of the Deccan Plateau proper. The old crystalline rocks yield a less fertile soil, and very much less cotton is grown than on the Deccan lavas. There are about 175 people to the square mile. Hyderabad is the natural centre of the plateau portions of the new state, and is well served by railways. *Kurnool* lies at the head of the Kurnool-Cuddapah Canal. This canal formed a small part of an enormous scheme to irrigate most of the drier part of Madras, but it was a failure.

The northern part of Andhra Pradesh lies in the Godavari Valley and cannot really be considered as part of the Deccan Plateau. The Godavari Valley almost forms a natural region of its own.

MYSORE

The former princely state of Mysore was ruled by a Maharaja who agreed to join the Union of India and established an Assembly. Mysore lay entirely on the high southern part of the Deccan Plateau. In 1956 the new state of Mysore was vastly extended so as to include districts on the plateau formerly in Bombay and western Hyderabad and also of the west coast. It now coincides largely with the lofty

southern part of the plateau where crystalline rocks outcrop and where Kanarese or Kannada is spoken.

The Deccan Plateau. In some books the whole of the plateau of Peninsular India is called the Deccan; but, strictly speaking, only the southern part should receive that appellation. In the south the plateau is higher, and has not been so cut into by river valleys as it has been farther north. The crests of the Western Ghats usually exceed 3,000 feet, and nearly the whole of Mysore is over 2,000 feet except where in the north the Kistna and its tributaries have cut deeply into the plateau. The Deccan Plateau lies in the rain-shadow of the Western Ghats, and is dry. A strip along the western side, which is really the slopes of the Ghats, is damper, but some of the plateau receives less than 20 inches a year. Unfortunately, too, the rainfall is irregular, and in some years the numerous tanks are not even filled with water.

The plateau consists entirely of old crystalline rocks. Gold is mined in the Kolar Goldfield in the south-east. Manganese ore is also obtained in the south. Although the old rocks yield rather poor soils, more than half the plateau is cultivated, and some of the flatter parts are irrigated. Forests cover a considerable area on the damper western parts and on the wetter slopes of other hills. Millet is the leading grain, but rice can be grown on the flat surface of the plateau in Mysore where there is irrigation from tanks. Cotton occupies one-tenth of the cultivated area. Coffee-planting was important in the old Mysore, until a disease destroyed many of the trees; with later recovery the state produces half the Indian total as well as some tea. Sheep flourish on the dry grass on the hillsides, and the Deccan Plateau has a quarter of all the sheep of India.

Mysore was the capital of the old state, but *Bangalore* is the largest town and seat of government of the new state. There are silk factories at Mysore and Bangalore. There have recently been great developments in hydro-electric power works and irrigation schemes, especially on the Cauvery. Farther north is *Bellary*, a considerable town.

The former tiny state of Coorg, with its principal town, Mercara, lies to the south-west of Mysore, on the slopes of the Western Ghats. Much of it is forested.

MADHYA PRADESH

In 1956 the boundaries of Madhya Pradesh, which had replaced the old Central Provinces, were completely changed. The heart of the old C.P., around Nagpur, is now included in Bombay; Madhya Pradesh has been extended northwards to include the old Central India and princely states such as Gwalior and Indore.

Madhya Pradesh now occupies a large area in the heart of India. It is larger than Uttar Pradesh, but has only one-third as many people. On the whole, the state is not so well developed as most of

the other states in India, largely because the country is not so suited for development.

The country is very varied. Running east to west through the heart of the state is the great line of highlands which divides Peninsular India from northern India—the Satpura Line. In Madhya Pradesh the highlands are known as the Mahadeo Hills and the Maikal Range, and pass eastwards into the Chota Nagpur Plateau. North of this line the country belongs to the Central Indian Foreland. South-east of this line is the flat land round Raipur, the Chhattisgarh Plain, or Valley of the Mahanadi. The wild hill regions of the Eastern Ghats lie on the borders with Orissa.

The Chhattisgarh Plain, or Valley of the Mahanadi, is a rice-growing region centring round the town of Raipur. The rainfall is only a little over 40 inches, so a good proportion of the land has been irrigated.

The Eastern Ghats form a wild hilly region, like the Chota Nagpur Plateau, inhabited largely by forest peoples.

Jubbulpore (Jabalpur) is a large and important town, occupying a key position at the head of the Narbada Valley, just where the Central Highlands can be easily crossed.

In the north of Madhya Pradesh lie numerous small states formerly grouped as Central India.

In the western half *Indore* is the largest town and is an industrial centre. *Bhopal* has few industries but it regained some of its former status since it became, in 1956, the State Capital. *Lashkar* and *Ujjain* have cotton factories. The town of *Gwalior* is on the borders of the Ganges Valley.

The Central Indian Foreland, including the regions known as Bundelkhand and Baghelkhand, lies between the Central Indian Highlands and the Ganges Plain. The rainfall is about 40 inches; millet and cotton are the most important crops. The eastern part is damper and is watered by the Son River.

RAJASTHAN (RAJPUTANA) INCLUDING AJMER-MERWARA

Rajputana included many native states in the north-west of India, south of the Northern Plains, now grouped as Rajasthan. Running through the centre of Rajputana from south-west to north-east is the Aravalli Range. North-west of this range the country is very dry, and slopes down gradually towards the Indus Valley and the Punjab Plain. This sloping area forms the Thar or Great Indian Desert. South-east of the Aravalli Range there is an upland country which may be called the Rajput Upland.

The Thar Desert is a vast area lying between the Aravalli Hills and the plain. It is a sandy waste, interrupted by bare rocky hills and waterless valleys. The ground is often entirely bare, but in some places there may be a few shrubs or fleshy plants. The rainfall is generally less than 10 inches, and is very irregular, falling

mainly during storms. Although the rainfall is greater than in the rich Indus Valley, the land remains a desert because there are no large rivers which can be used for irrigation. The desert is almost uninhabited. Villages may spring up where there is a little water, and some millet can be grown; but when the water supply fails, the village has to be abandoned. Many people own camels, and trade across the desert. *Jaisalmer* is a centre of the camel caravan routes. *Bikanir* is noted for its manufactures of camel-hair goods and cotton goods. Throughout history the desert has formed a great barrier to the movement of man.

The Rajput Upland Region, as a whole, is a dry region, receiving less than 40 inches of rain, but in the damper and more sheltered parts forests can grow. Most of the area consists of old crystalline rocks, but in the south there are great sheets of Deccan Lava. Owing to the irregular rainfall, the region is thinly populated. The staple food is millet, and much grain is grown for fodder. Agriculture is bad, and so more people earn their living by industry than in other parts of India. Woollen goods, especially blankets, are made from the wool of sheep and goats in many places. In the drier parts, bordering the Thar Desert, camel hair is used for carpets, etc.

Ajmer is a large town with railway workshops, food and textile industries. It is also situated on an important railway. *Jaipur* is the capital of the Rajasthan Union and has over a quarter of a million people. *Jodhpur* is another large town.

The other towns in Rajputana, such as the beautiful and historic Udaipur, owe their importance usually to their being capitals of small states now formed into the Union.

OTHER DIVISIONS OF INDIA

The policy of the Indian government since Partition has been to combine the smaller states into unions comparable in size or importance with the existing states or former provinces. This has presented many difficulties and some of the unions are small and some separate states retain their individual status. This is the case with Manipur and Tripura on the Assam-Burmese borders. The former Punjab Hill States in the Himalayas form Himachal Pradesh, whilst the Andaman and Nicobar Islands remain a territory under a Chief Commissioner. The Andaman and Nicobar Islands are both interesting groups. They are hilly, have an almost equatorial climate and are still largely covered with evergreen forests. A few hundreds only are left of the aboriginal inhabitants and there is plenty of room for settlers. The Andamans were long used as a penal settlement. The Laccadives form another territory.

BURMA

The Union of Burma became an independent republic in 1948 with the friendly agreement of the British Government. Until

1937 it had been a province—the largest—of the Indian Empire, but in that year was separated from India. It was invaded and occupied by the Japanese from 1941 to 1945 and suffered much



FIG. 240.—General map of Burma.

destruction. It is shut off from India by a wall of mountains over which there is no railway nor proper road, so that Burma can only be reached from India by sea. The people who inhabit Burma are Mongolians, more closely allied to the Chinese than to the Indians.

In the Union are the numerous native states collected together as the Federated Shan States, as well as certain hilly tracts which are not administered at all.

Physical Features. The important feature of the mountain ranges and the rivers is that they both run from north to south. The River Irrawaddy is navigable by river steamers as far north as Bhamo, nearly 1,000 miles from its mouth. Its big tributary, the Chindwin, is also navigable for several hundred miles. Some of the smaller tributaries can be used by small boats, but they are more important for floating logs of timber from the forests to the main river. The Salween is only navigable by steamers for about 80 miles, when it passes through a gorge with rapids. The coasts of Burma are quite different from those of India. Both the Arakan and Tenasserim coasts are rocky and fringed with numerous islands.

Geology. The Arakan Yomas and the Pegu Yomas are two fold ranges of young rocks. Between the two lies an area of young soft rocks, little folded, forming the valley of the Chindwin and the Lower Irrawaddy. It is here that the great oilfields of Burma are found, and Burma produced about 270,000,000 gallons of oil every year. When the Japanese invaded the country the wells were put out of action and production is only now slowly recovering. The mountainous eastern half of the province—that is, the Shan Plateau and its southward continuation into Tenasserim—consists of old hard rocks. In the north rubies and other precious stones are found at Mogok, but the mines are not so important as they used to be. At Bawdwin is one of the largest deposits of silver and lead ore in the world. The ore is smelted near by at Namtu. There are also deposits of silver and lead ore farther south, and tin ore at Mawchi. Tenasserim has rich deposits of tin, especially around Tavoy, and with the tin is found wolfram. There are numerous deposits of poor-quality coal in Burma, but they are not yet mined.

Climate. The important feature about the climate is the “Dry Belt” of Central Burma, which lies in the rain-shadow of the Arakan Yomas and receives less than 40 inches of rain a year. All the coastal region receives a very heavy rainfall. Central Burma is very hot in the hot weather owing to the absence of clouds and the cooling influence of rain, as well as distance from the sea.

Vegetation. Burma is less thickly populated than most parts of India, and so natural vegetation still covers a very large part of the country. Where the rainfall is more than 80 inches, evergreen forests are found, but the valuable forests of Burma occur where the rainfall is between 40 and 80 inches. It is here that the monsoon forests with teak, pyinkado, in, ingyin, and other valuable timber trees are found. Teak is very rarely found by itself. It is nearly always mixed with many other trees. The teak forests are found on

the Pegu Yomas, the eastern slopes of the Arakan Yomas, and the hill ranges north of the Dry Belt. Some teak is also found on the Siamese border, and is floated down the River Salween to Moulmein. The drier parts of Burma are covered with scrub land, whilst the hills and plateaus above 3,000 feet are clothed with evergreen oak forests together with some grassland.

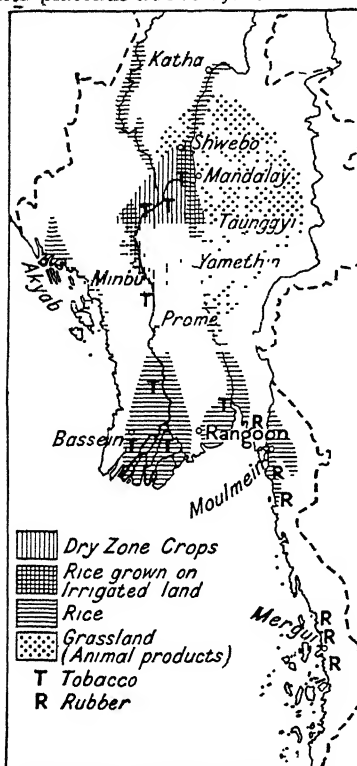


FIG. 241.—The crops of Burma.

The cultivated land is found mainly on the broad stretches of alluvium which border the rivers and build up their deltas. People of the hills merely grow enough for their own needs on small clearings in the jungle near their villages. The great food grain of Burma is rice, which occupies two-thirds of all the cultivated land in the province. In the Dry Belt sesamum, millet, beans, ground-nuts, and cotton are grown.

Population. Although Burma covers 260,000 square miles, it has only about 18,000,000 people. Over three-quarters of these are Burmans, and they live mainly on the fertile alluvial lands by the rivers. They are all Buddhists by religion, and have no caste system; in most respects men and women have equal rights. The hilly regions and the plateaus are inhabited by more backward people, such as the Chins of the

Arakan Yomas, the Karens of the Pegu Yomas, the Shans, Palaungs, and the Was of the Shan Plateau, and the Kachins of the north. They number about two millions. Numerous Chinese and Indians of all sorts have settled in Burma.

Natural Regions. Burma falls very simply and naturally into seven natural regions.

The Arakan Coastal Strip forms a narrow tract of land between the mountain wall and the Bay of Bengal. It is broadest in the north and gets narrower towards the south. It is almost everywhere hilly; only in one place is there a stretch of flat land. The coast is rocky, and there are numerous inlets and islands. The rivers are for the most part short rushing torrents from the mountains. Only one-tenth of the land is cultivated, one-half is waste land, and the

remainder is covered by evergreen forest or bamboo jungle. Some, but not all, of the waste land might with difficulty be cultivated. The region catches the full force of the south-west monsoon, and all parts get a heavy rainfall—not less than 100 inches. By far the most important crop is rice. Most of the people live on the flat land which lies near the town of Akyab. Akyab has a good harbour, but is only a small port because it has a small hinterland backed by high mountains. Some fishing is carried out along the coast. The only easy way between Arakan and the remainder of Burma is by sea.

The Tenasserim Coastal Strip also forms a narrow tract of land, between the Siamese border and the Gulf of Martaban. In many respects it is like the Arakan coast. It is nearly everywhere hilly or mountainous: only in the north, around Moulmein, is there a stretch of flat land. The country is formed largely of ranges of hills running north to south and consisting of granite. Where the granite masses reach the sea they form rocky islands. Between the granite ranges is lower land consisting of old but softer rocks which have been worn away near the coast to form low islands or mangrove swamps. A

large part of the region is covered with dense evergreen forests of equatorial type. Everywhere the rainfall is more than 100 inches, and often more than 200. Rice is again by far the most important crop. Rubber plantations cover a considerable area. Less than one-tenth of the area is cultivated. The majority of the people live

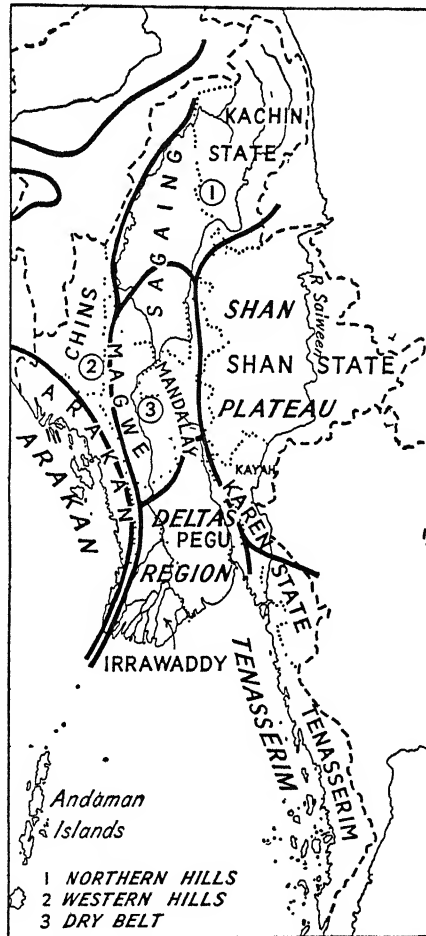


FIG. 242.—The natural regions and political units of the Union of Burma.

around the old port of *Moulmein*, but the harbour is becoming choked by mud brought down by the Salween and is not suitable for large ships. During the Japanese occupation, with the ruthless use of prisoners, a railway now disused was built to link Moulmein with the Siamese system. *Tavoy* exports the tin which is mined in the district. Farther south is *Mergui*. From the west bank of the Salween, opposite to Moulmein, there is a railway to Rangoon.

The Western Hills Region consists of a series of parallel ranges, sometimes rising, as in Mount Victoria, to 10,000 feet. The hills are difficult to cross, and there are only a few difficult mountain paths from one side to the other. The region is clothed mainly with a poor evergreen oak forest, of very little value. In places there are pine forests, but the forests are economically inaccessible. Large parts of the region are practically uninhabited. The few Chin inhabitants lead a miserable existence by growing a few crops on hillside clearings.

The Shan Plateau is a broad area of old hard rocks, mostly 3,000 feet above sea-level, but deeply entrenched by the deep, narrow Salween Valley, and by other river valleys. The western border is well marked, and the land drops rapidly to the level of the Irrawaddy and Sittang Valleys. The plateau receives a moderate rainfall and a large area of the waste land might be cultivated, but the land is very sparsely populated, and the various hill tribes are not very progressive. There are also considerable areas of grassland suitable for sheep, goats, and cattle. Two railways penetrate into the plateau; one from Mandalay to Lashio. Near this railway, and connected with it by a narrow-gauge line, are the Bawdwin Mines and Namtu Smelting Works. To the north of the Shan Plateau lies the most important of the routes from Burma to China, the famous Burma Road, usable by motors. There is tin at Mawchi.

The Northern Hills Region. This region stretches from the mountain wall which separates Burma from Assam and Tibet, as far southwards as the borders of the Dry Belt. To the west of the region lies the valley of the Chindwin; in the east the valley of the Irrawaddy. In the north the country is wild, inhabited by a few Shans and Kachins. The famous jade mines of Burma are in this region, and the jade is sent to China through Bhamo.

The Dry Zone is, next to the Deltas Region, the most important region of Burma. It is, generally speaking, a plain, and in the centre lies the isolated peak of Mount Popa, nearly 5,000 feet high. Mt. Popa is an old volcano, and lies at the northern end of the Pegu Yomas. The Dry Zone may be defined as the region of Burma which receives less than 40 inches of rainfall. In the centre the rainfall is as low as 20 inches. It is too dry for the proper growth of forests, and the natural vegetation is a poor scrub. One of the small trees is cutch, from which a yellow dye is made. Although

it is so dry, there is a good population in the Dry Belt. Some parts, especially south of Mandalay, are irrigated and rice is grown: in other parts the typical Dry Zone crops—sesamum, millet, beans, ground-nuts, and cotton. The main oilfields of Burma are situated in the Dry Belt. The most important are Yenangyaung and Singu. Most of the oil is sent by pipe-line direct to the refineries at Rangoon. The Dry Belt is the natural centre of Burma, and from it all parts of the country are easily reached, especially by the Irrawaddy, which forms the great highway. So we find the old capitals, such as Mandalay and Pagan, are in the Dry Belt.

The Deltas Region comprises the most important part of Burma. It consists of the broad valley of the lower course of the Irrawaddy and its large delta, and the narrower valley of the Sittang and the much smaller Sittang delta. Separating these two alluvial plains is the low range of the Pegu Yomas, covered with valuable forests. Rangoon is situated at the southern end of the Pegu Yomas, and so commands both valleys. The rainfall is good, over most of the true delta it is more than 80 inches, but decreases northwards. At the southern end of the Pegu Yomas evergreen forest is found, but farther north is monsoon forest of teak, pyinkado, and other valuable trees. It is the nearness of these forests to Rangoon and the sea which has made them specially important. The lower, alluvial lands are almost entirely cultivated, and by far the most important crop is rice. This part of Burma is thickly populated, except in the forests. The cultivators are mostly Burmans. The towns of the region are mostly collecting centres for rice—examples are Henzada, Bassein, Maubin, Pegu. Notice how well Rangoon is situated, so that it can collect and export the produce of nearly all parts of Burma.

Communications of Burma. The River Irrawaddy and its tributary the Chindwin are still the most important highways of Burma. Small boats can use many of the smaller streams, and where the small streams join the main river, ports often spring up. Many of the creeks of the Irrawaddy Delta can be used by quite large steamers, and two canals have been cut to make the journey across the delta from Bassein to Rangoon shorter. The rice grown in the delta is brought to Rangoon by "paddy boats" through the delta creeks. Many of the small streams of Burma are used for floating logs of timber from the forests to the saw-mills. The railways of Burma are all metre gauge. The main line runs up the Sittang Valley to Mandalay. A bridge (destroyed during the occupation) takes it across the Irrawaddy there and it continues to Myitkyina. Another line from Rangoon runs to Prome on the Irrawaddy, but the big oilfields and many towns of the Dry Belt can only be reached by river. Burma has very few roads, but there is now a main road between Rangoon and Mandalay and some thousands of miles of

metalled road were constructed in the thirties. Three important roads penetrate the Shan Plateau—one to Mogok, one to Maymyo, and one to Taunggyi, and on to the Chinese border. The famous Burma Road runs from Lashio (with a branch from Bhamo) in Burma to the heart of the Chinese province of Yunnan. It enabled supplies to be sent to China (prior to the Japanese occupation of Burma in 1942) when Chinese ports were cut off.

The Trade of Burma. Independent Burma has not recovered from the destruction of the Japanese occupation and war. Since 1948 much of the country has been in control of insurgents and robber bands. Normally Burma has four main exports—rice, petroleum and its products, lead, and teak; less important are cotton, silver, etc. Since the Second World War rice has formed 75 per cent. of the exports, followed by teak, cotton, and rubber. Much of the rice used to feed India and Ceylon. As with the imports of India, the imports of Burma were normally cotton goods (from India, Great Britain, and Japan), machinery (from Great Britain and the United States), and coal. Most of the trade of Burma passes through Rangoon. The minor ports are Akyab, Moulmein, and Bassein.

CEYLON

Position. Ceylon is a pear-shaped island about 25,000 square miles in area, situated to the south of Peninsular India, with which it is structurally comparable, and must once have formed part of the same massif. It is farther south than any part of India or Burma, and Colombo is only 7° N.

Physical Features. Ceylon consists of a central mass of mountains, surrounded by broad coastal plains. Many of the central mountains are high, the highest being more than 8,000 feet. In the north the coastal plain is flat and there are several sandy peninsulas. The end of the Mannar peninsula is only 22 miles from the nearest point of India (Dhanushkodi). Ceylon is very nearly joined to India between these two points by a line of sandbanks and rocks called Adam's Bridge.

Geology. The mountains of Ceylon consist of the same old, hard, crystalline rocks as the Deccan. These rocks also underlie the coastal plain, but there they have been covered by a thick coat of *laterite*, a rock formed in hot, wet countries with alternating dry and wet seasons. Laterite is a soft red or brown rock which hardens on exposure, and has a cellular texture like a coarse brick. In the north of the island the old rocks have been covered by soft limestone. Round the island there are many sand-dunes. The old, crystalline rocks of Ceylon are noted for their beautiful gemstones and for the mineral graphite.

Climate. Ceylon is nearer the equator than any part of India,

and has almost an equatorial climate. The daily range of temperature is very small; at Colombo it is only 12 degrees. The annual range is also very small. January is the coolest month (80 degrees), and May the hottest, but at Colombo there is only a difference of

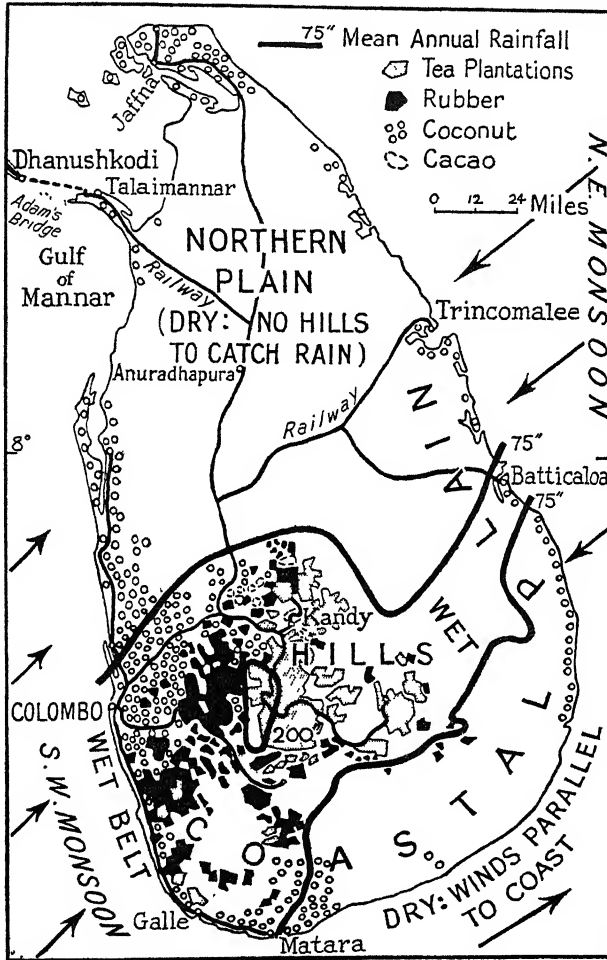


FIG. 243.—Map of Ceylon.

Illustrating rainfall and distribution of the chief commercial crops

5 degrees between the two. Ceylon gets its rain from both the north-east and south-west monsoon. There is a heavy rainfall on the west and south-west coasts and the mountains from the south-west monsoon, and also a heavy rainfall on the north-east coast and eastern slopes of the mountains later in the year from the north-east

monsoon. The northern part of the island has no hills to intercept the winds, and is a dry region. So also is the south-eastern part of the island. Thus, despite the small size of Ceylon, it has a varied climate.

Vegetation. Just as the climate of Ceylon varies a great deal, so does the natural vegetation. The lower slopes of the mountains used to be covered with thick evergreen forest, but are now largely cleared for rubber plantations and tea gardens, and there is little timber of value left. The wetter parts of the lowlands were also covered with wet evergreen forests, and the drier parts with scrub forests. A great part of the wetter land is now used for rice and coconuts, but the drier parts are still untouched.

Taking the whole of Ceylon, nearly a quarter is cultivated. Thick forests cover about one-fifth of the area, scrub a much larger area, and much land now waste is potentially productive.

Population. There are rather over 9 million people in Ceylon. The principal race is the Sinhalese or Ceylonese, who, between 2,000 and 3,000 years ago, came from the north of India and conquered Ceylon. The Sinhalese are Buddhists by religion. At Kandy is the Temple of the Tooth, where a tooth of Buddha is preserved, and which is one of the most sacred places in the world to Buddhists. The north of Ceylon is inhabited mainly by Tamils who are Hindus by religion, and who came over from India either as conquerors in past ages, or more recently as labourers in the tea gardens, cocoa and rubber estates. The Moors are Mohammedan traders, boatmen, or fishermen who came originally from North Africa. The descendants of the old Portuguese and Dutch settlers are called Burghers. In the wilder parts of the mountains there are still a few Veddas, a very primitive hill tribe. The people live mainly on the wetter parts of the plains and on the hills; very few live on the dry, infertile soils of the northern regions and the east.

Government. Ceylon is entirely separated from India in matters of government. The first Europeans to settle in the island were the Portuguese in 1505, followed by the Dutch, and later by the English. The old Dutch ports are still to be seen at Galle and other places. The Dutch settlements were occupied by the British in 1796 and annexed to Madras, but became a separate colony in 1802. The whole island came under British rule in 1815, and after passing through various stages of diminishing official control, became a fully self-governing member of the British Commonwealth on February 4, 1948.

Natural Regions. Ceylon, though only a small country, must be divided into at least three natural regions:

- (1) The Hill Country, comprising the central mountain mass of the island, roughly the land over 1,000 feet.

- (2) The Maritime Belt, or Coastal Plain of the east, south, and west.
- (3) The Northern Limestone Plain, occupying the northern end of the island.

The Hill Country consists of a series of ridges, separated by deep valleys, running roughly from north-east to south-west. Very little is now left of the vast forests which covered this region before the days of European planting. The trees are nearly all evergreen, and get smaller the higher one goes, so that above 5,000 feet the trees are too small to be useful as timber. At intervals there are broad, marshy or grassy plains, like that of Nuwara Eliya and the Horton Plains, surrounded by mountains. The rainfall of most of the region is heavy; the rain does not fall so heavily as on the plains, but is more continuous, and for days, or even weeks together, the sun may be hidden by dense clouds of mist. The greater part of the rain falls during the south-west monsoon, from June to October. Most of the rubber plantations are found in this region, especially on the western side, as well as nearly all the tea gardens. The latter are most numerous between Kandy and Nuwara Eliya. North and north-east of Kandy the cacao tree is grown, from which cocoa is obtained. Many of the valley sides are steep, but are very carefully terraced for the growth of paddy. A large amount of coffee used to be grown in Ceylon, but it was practically wiped out by disease in the seventies of last century.

The old hard rocks which make up the mountain country are famous for gemstones, sapphires, spinel rubies, moonstones, etc. There are hundreds of small gem-quarries, especially where the gems have been washed out of the old rocks and into the gravels of the valleys, as around Ratnapura. Another important mineral is graphite, used for making lead pencils. The most important mines are in the Kurunegala district.

Kandy, the old capital, is in this region, and is reached by a wonderful hill railway from Colombo, 72 miles away. Nuwara Eliya is a well-known hill station.

The Maritime Belt is a broad belt below 1,000 feet, lying round the central mountain core. Over this stretch the old hard rocks are hidden by deep red soil of laterite. All along the coast, thrown up by wind and waves, there are lines of sand-dunes. Just as on the west coast of India, large brackish lagoons are found behind the sandy ridges. The climate of the maritime belt varies greatly. The western and south-western sides get a heavy rainfall from the south-west monsoon, the south-eastern side is dry, whilst the eastern side is again wetter, receiving its rain largely in November and December from the north-east monsoon. The wet low country is thickly populated and widely cultivated, especially on the west

and south-west of the island. The level lands and the valleys are occupied by rice-fields, yielding two crops a year, one after each monsoon. The higher lands towards the hills are covered by the mixed tree cultivation of the Sinhalese. Each farmer has coconuts, areca nuts, mangoes, breadfruit, together with yams and small plants like pepper. On the borders of the hill country are rubber and tea plantations. All along the coast are groves of coconuts and industries connected with the coconut find employment for a large number of people. The kernels are roughly dried for export as copra; even more important is the export of carefully dried or

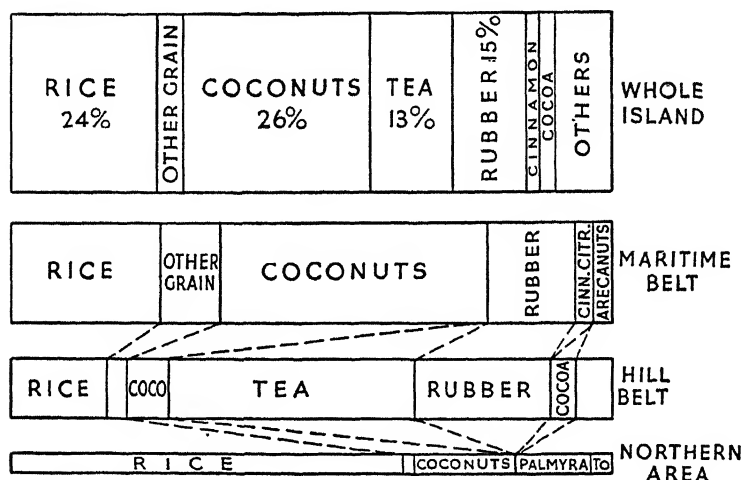


FIG. 244.—The crops of Ceylon, according to the area of the total cultivated land occupied.

“desiccated coconut” prepared in factories; there are also factories for the preparation of coconut oil. The preparation of coir is mainly a cottage industry. Areca nuts are also grown for export. Of the spices for which Ceylon has long been famous, cinnamon is the most important. The cinnamon tree likes a very light sandy soil, and grows in those parts of the maritime belt where such a soil is found. The industry is less important than formerly. The cinnamon of commerce is obtained from the inner bark of young shoots. Other spices are cardamoms, cloves, etc. Citronella oil, prepared from a grass, is obtained mainly in the south-west of the island. The parts of the maritime belt away from roads and railways, especially in the dry parts of the south-east and in the east, are very thinly populated, and there is much waste land. The railway across the island to Trincomalee, opened in 1925, with a

branch to Batticaloa, has done much to open the east coast. Round the coast, fishing is an important industry.

The capital of Ceylon—Colombo—is on the west coast, where a shallow bay afforded some shelter from the force of the south-west monsoon. Now a fine breakwater encloses an artificial harbour, and Colombo is not only the principal port of Ceylon, but a great entrepôt port also. Before the harbour of Colombo was finished, Galle used to be the principal port of call. It has a pretty, natural harbour, but one with an exposed and dangerous rocky entrance, guarded by an old Dutch fort. Trincomalee on the north-east coast, has a fine large natural harbour, but its hinterland is not important and the port is little used.

The Northern Plain covers the whole of the north of Ceylon, and does not rise more than 200 or 300 feet above sea-level. The plain is formed in the north by a pale limestone, covered by a thin bright red soil. Round the coast are sand-dunes. Most of this region gets about 40 inches of rain, but the soil is dry and poor, and there is much waste land covered with scrub jungle. The palmyra palm flourishes in this northern region. Cultivation is protected by numerous "tanks," mostly very old. Jaffna, situated on the Jaffna peninsula, is the most important town in this natural region. At the end of the Peninsula of Mannar is Talaimannar, the terminus of the Ceylon Government Railways, where steamers run daily to Dhanushkodi, 22 miles away, the terminus of the South Indian Railway. South of the Mannar Peninsula is an area of shallow sea (the Gulf of Mannar) famous for its pearl fisheries.

Communications. Colombo is the centre of the broad-gauge Ceylon Government Railways. One line runs southwards along the coast to Galle and Matara, whilst the main line runs north-eastwards through the old historical town of Anuradhapura to Jaffna, with a branch to Talaimannar. Another line runs from Colombo up to Kandy, and winds amongst the hilly country to Badulla, with a small branch to Nuwara Eliya. Mention has already been made of the lines to the east coast ports of Trincomalee and Batticaloa. There are numerous excellent roads in Ceylon which link up outlying places with the railways.

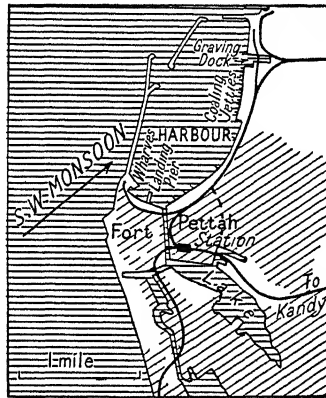
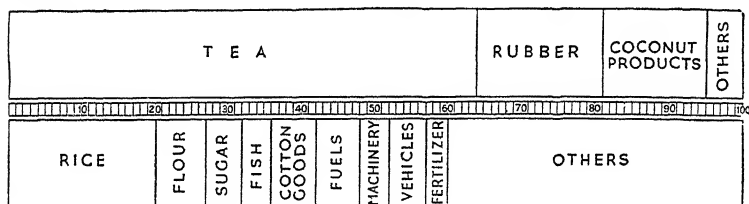


FIG. 245.—Sketch-map of Colombo Harbour, showing how it is protected from the South-West Monsoon.

The Trade of Ceylon. In value the trade of Ceylon is roughly the same as that of Karachi or Rangoon. Nearly all the trade passes through the great port of Colombo.

Ceylon has three main exports (see Fig. 246)—tea, coconut products, and rubber; others include areca nuts, citronella oil, cacao, and cinnamon. Although Ceylon has not a very large population it does not grow enough food for its people, and imports much rice, especially from Burma. The other imports are similar to those of India.



plains of the Ganges overlie the ancient rocks of the Peninsula, so the old rocks of Indo-China are in places hidden beneath wide stretches of alluvium. Alluvium makes up the Menam plain in Siam and the lower Mekong plain to the east. There are also some small basins, once occupied by lakes, now important because some of them contain seams of coal. Among the older rocks the most important are the numerous intrusions of granite—usually elongated in a north-south direction—important because of the rich deposits of tin ore associated with their margins. South-East Asia supplies two-thirds of the world's output of tin—from Malaya, two small islands of Indonesia, Siam, and China.

Around this central core is a succession of Tertiary fold ranges, of approximately the same age as the Himalayas. These ranges form a series of curvilinear “festoons,” some partly submerged so that they form merely lines of islands. Volcanic cones are associated with most of these lines and a number of volcanoes are still active.

Climate. Broadly speaking, there are two main climatic zones:

(a) The *Equatorial Belt* stretching from about 8° N. to 8° S., and hence including all the East Indies (except the Philippines) and Malaya.

(b) The *Tropical Monsoon Belt*, lying to the north and including all Indo-China and the Philippines.

In the *Equatorial Belt* there is the usual high average temperature throughout the year—ranging from about 78° to 81°. Whilst much of the rainfall is convectional, the East Indies lie within the sphere of influence of the monsoons, each blowing for half the year. Thus most stations have two rainfall maxima, the chief rainy season depending on the aspect of the station. On the northern sides of the islands the rainfall reaches a maximum about January or February; on the southern sides in July and August. In the *Tropical Monsoon Belt* the seasons are broadly the same as those in India, except that the east coasts of Indo-China and the Philippines, exposed to the winter monsoon, have a considerable rainfall in October, November, and December.

The Pacific Typhoon belt affects the northern part of the Philippines and curves away northwards.

Vegetation. The natural vegetation of the Equatorial belt is hot, wet, evergreen forest, which often stretches in an unbroken sweep from the sea-shores to the highest hills. Indeed, there is little change in the forest until heights of over 5,000 feet are reached. These Asiatic forests are not, however, of the gloomy, vault-like type found in the Amazon Basin, but extraordinarily attractive, with little shafts of sunlight penetrating to a floor richly carpeted with vegetation. In the Monsoon belt there is the same range of vegetation as that described under India.

Population and Development. South-Eastern Asia offers some extraordinary contrasts in population and development. The Indo-Chinese Peninsula as a whole is a potentially very productive but distinctly under-populated area, situated between two of the most densely peopled agricultural lands in the world—India and China. The western sides (Burma and part of Malaya) have been peacefully invaded by Indian immigrants; the remainder by Chinese immigrants in enormous numbers. This applies also to Malaya. The East Indies supply curious contrasts in the development of equatorial lands. There is Java with its productive soils, intensive cultivation, dense, progressive population, and extensive foreign trade. Contrasted with this, much of Borneo and New Guinea is sparsely



FIG. 248.—Political spheres of influence in S.E. Asia and the East Indies. Western New Guinea remains Dutch.

populated with primitive head-hunting tribes who have scarcely reached the stage of civilization when agriculture becomes of importance.

Political Geography. The whole area has recently been “growing up” politically. Invaded and occupied by the Japanese from 1941 to 1945, after liberation rapid changes took place. Burma became an independent republic, Malaya was reorganized as a Federation of States; North Borneo, Brunei, and Sarawak became British Crown Colonies. The Republic of Indonesia replaced the Netherlands East Indies, the Republic of Viet-Nam replaced much of French Indo-China. Portugal retains half of the small island of Timor; whilst the Philippine Islands, which passed from Spain to the United States in 1899, became independent.

THAILAND OR SIAM

Position and Size. The independent kingdom of Siam has an area of slightly over 200,000 square miles, with a population of approximately 17½ million. The country is called by its inhabitants "Thai," meaning "the Kingdom of the Free," and until recently was the only part of south-eastern Asia remaining independent of European Powers.

Natural Regions. Geographically Siam falls naturally into four main divisions, shown in Fig. 249: Northern, Central, Eastern, and Southern Siam.

Northern Siam, over a quarter of the country, consists of a series of hill ranges and valleys trending north and south. The thickly-forested hills gradually increase in height towards the west and north, that is, towards the borders with Burma and French Indo-China. The valleys in the north are only narrow, forested gorges but southwards become broad, open, cultivated tracts, and afford some of the most valuable agricultural land in the kingdom, and it is here that the bulk of the population of Northern Siam is found. The four principal streams draining this region unite in the south to form the Menam.¹ The town of Chieng-mai lies in the heart of the region and is connected with Bangkok by rail.

Central Siam, of about the same area, consists almost entirely of one vast plain, stretching from the mountains on the borders of Burma on the west to the ridge which divides it from Eastern Siam on the east. The plain is drained by sluggish streams, and it is liable to floods, hence, despite its fertility, only a quarter is at present under cultivation. Drainage and a larger population are the only factors necessary to make Central Siam one vast rice-field, and projects have already been undertaken towards this end. Bangkok, the capital of Siam, is the port and outlet for the whole region.

Eastern Siam, again of about the same area, is a huge, shallow basin cut off by the rim of hills from rain-bearing winds and suffering not only from deficient rainfall but also from a poor soil. Hence this region is thinly populated and comparatively unimportant.

Southern Siam, a smaller area, comprises all the narrower part of the Malay Peninsula, and in places is scarcely more than a dozen miles wide. As in Tenasserim and Malaya there are north and south ranges of forested mountains, and the population is concentrated in the more open valleys and plains of varying extent, where rice is the principal crop. Tin-mining is important in this region, especially near the town of Puket. The railway now runs right through Southern Siam, connecting Bangkok in the north with Singapore at the extreme southern end of Malaya.

¹ Menam = river, here "the" river, strictly Menam Chao Phya.

Overwhelmingly the most important product and export of Siam is rice. This emphasizes the comparatively small population of Siam, which permits the production of this essential food-stuff in great excess of home requirements. Rice actually covers about four million acres and the annual production is about four million tons. Second in importance amongst the exports are tin ore from the south and teak obtained from the forests of the north-west. The logs are floated down the Menam to Bangkok, or to some extent down the Salween to Moulmein.

The great town and port of Siam is Bangkok on the River Menam, and sometimes called, on account of the numerous canals running through the city, "the Venice of the East." Siam, like the countries surrounding it, is being very much affected at the present time by Chinese immigration

EASTERN INDO-CHINA

The old French Indo-China had a total area of more than a quarter of a million square miles and a population of about 30 millions. It is thus larger and more populous than Burma on the other side of the Indo-Chinese Peninsula.

The traditional divisions of the French sphere of influence in Indo-China are five—Tongking, Annam, Cochinchina, Cambodia, and Laos. In 1946 Tongking and Annam united to form the Viet-Nam Republic. In 1947 Cochinchina adopted a republican form of government, but in 1949 was attached to Viet-Nam. Cambodia (capital Pnom-Penh) and Laos (capital Vientiane on the Mekong) were recognized in 1948–49 as independent kingdoms within the French Union. Viet-Nam also remained within the French Union, but the Communist-led Viet-Minh forces with which there was much fighting stood for close alliance with Communist China. Links with France have been severed and there are now four independent countries—Cambodia, Laos, South Vietnam and North Vietnam.

Cochinchina is the great delta of the Mekong. Much is still occupied by marsh land, but two-fifths of the whole are cultivated and fairly densely populated, the bulk of the land being covered by rice-fields. The town of Saigon, situated to the east of the delta proper, is the great port of the region, and is naturally important in the rice trade, since rice is produced greatly in excess of home requirements (compare Rangoon and Bangkok). Again the proportion of Chinese immigrants in Saigon and the neighbouring city of Cholon is noteworthy.

Cambodia is a much larger area, forming a basin comparable in size and character with that of Eastern Siam, but rather more fertile. The land is but thinly populated, and the present production of rice, cotton, pepper, and other crops could be greatly extended. Fishing in the great lake of Tonlè Sap is very important. The

principal town is Phnom-Penh on the Mekong, and is accessible by ocean-going vessels.

Laos (Capital: Vientiane) is a tangle of forested hills and plateaus with valuable forests, but very inaccessible and very undeveloped.

Annam stretches for a long distance along the coast, and the most important part is the succession of small basins, separated from one another by spurs from the main range, which reach the coast itself. The spurs make communication difficult, but a through railway now runs the whole length of the coast. The comparatively small area of flat land and the difficulty of communication have resulted in the capital Hué and its port Tourane being smaller and less important than the principal ports of the north and south. In addition to rice, the important products of Annam are silk and tea.

Tongking, a much larger area, consists of a series of broad river valleys, notably that of the Red River and its tributaries, separated by lofty, forested spurs from the Yunnan plateau of China. Mining is important, especially for coal and zinc, but again the chief occupation is rice cultivation, though Tongking contrasts with Cochin-China in that there is little excess available for export and little opportunity of extending the area already under cultivation. The chief town of Tongking is Hanoi, former capital of the whole of Indo-China, and Haiphong is the principal port.

MALAYA

Introductory. The Malay Peninsula, or Malaya, forms the southeastern extremity of the mainland of the continent of Asia. It is the British sphere of influence in the Peninsula, and before the Second World War consisted of the British Colony of the Straits Settlements (including the islands of Penang and Singapore and Malacca on the mainland), the Federated Malay States and five other Malay States. The country was attacked and occupied by the Japanese from 1941 to 1945. After liberation Singapore became a separate Colony whilst the nine Malay States, Penang and Malacca, became in 1948 the Federation of Malaya (Capital: Kuala Lumpur). Christmas Island (phosphates) is a dependency of Singapore now also a self-governing state (1958); the Cocos (Keeling) Islands, long a dependency, have been transferred to Australia as an air halt.

Physical Features. In general Malaya is hilly or mountainous, and there are few large tracts of flat ground. The main mountain divide lies near the west coast, and several parts of it rise to over 7,000 feet. Actually, however, there is not a single well-defined central ridge, but a number of ridges roughly parallel to one another and to the coast lines. West of the main divide the country is undulating, fertile, and extensively developed, though east of the same divide it is a mass of wild forested mountains and very much less developed. Geologically Malaya belongs to the great central

core of South-Eastern Asia, and the main mountain ridges are formed of masses of granite elongated in a north-south direction, though some of the mountains to the east are formed of quartzites and shales. The granite masses are important because of the tin deposits associated with their fringes, although actually most of the tin ore obtained in the country comes from the alluvial deposits of the valleys, the ore having been removed by denudation from its original position and washed down into these valleys. There are some small basins of young rocks in various places, of which the one near Kuala Lumpur is important, for it contains considerable seams of coal, mined for use on the Malay Railways.

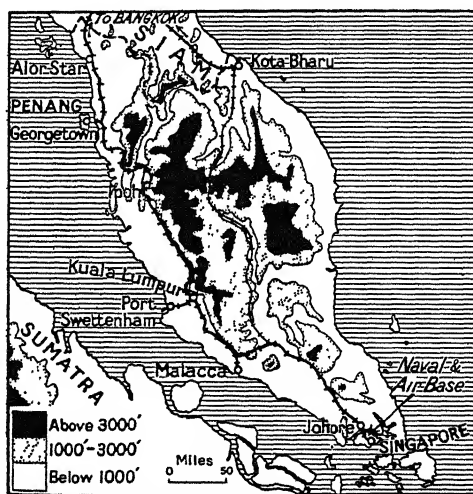


FIG. 249.—Map of Malaya.

Climate and Vegetation. Malaya lies entirely north of the equator, but the northern boundary of the British territory is only about $6^{\circ} 30' N$.

The climate of Malaya is an excellent example of an equatorial type, and consequently the economic development of the country sets a splendid standard of achievement for this type of climate. The principal feature is not the great heat—one never gets the same high temperatures as in the monsoon lands—but the extraordinary monotony, the same throughout the year.

The natural vegetation of Malaya is dense, evergreen equatorial forest, extending from sea-level to the top of the highest ranges; whilst along the flat coastlands of the west coast are huge mangrove swamps, and on the sandy strands of the east coast are narrow bands of the graceful casuarina tree. In its natural form the forest does not furnish much that is of direct use in commerce, though gutta-

percha is obtained from a tree grown in the Peninsula, and another yields the substance jelutong, much in demand in the United States in the manufacture of chewing-gum.

Agriculture. Agriculture in Malaya may be divided into the native cultivation of the Malays and the plantations run under European and Chinese supervision.



FIG. 250.—Malaya: agricultural areas (shown in black) illustrating their importance on the west coast.

The Malays have concentrated on the west coast valleys and some of the eastern coastlands where rice can be grown, but their production is mainly for their own use and does not suffice to feed the Chinese and Indian population of the Peninsula, with the result that three-eighths of the total rice consumed in the country has to be imported. The Malays are a cheerful, country-loving race, and the great development in the towns has been mainly by Chinese. Away from the coasts and valleys there is little cultivation; parts of the forests are still inhabited by the very primitive Semang, who afford an excel-

lent example of a primitive race unable to make headway against the forces of nature, unarmed with the devices employed by the civilized West. Plantation development dates really from the establishment

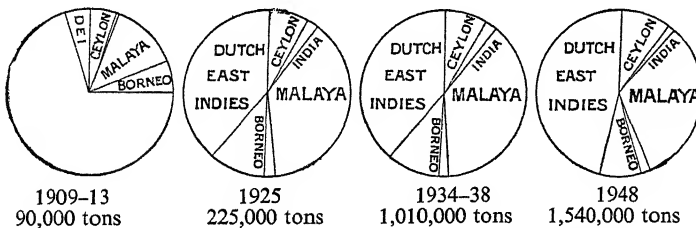


FIG. 251.—World production of rubber, showing the relative importance of production in Dutch and British Asia.

of rubber estates on a commercial scale about 1895. At first progress with the new crop was slow, but after 1905 there was an amazing expansion, the rubber boom lasting until 1919, when overproduction became a serious difficulty. In 1919 the production of rubber reached over 200,000 tons and the average for the next ten years was

rather over this figure. In 1934-38 Malaya produced 425,000 tons; in 1948 production exceeded 700,000 tons. Rubber occupies an area in Malaya exceeding three million acres, mainly on the lower hills and low ground of the west of the Peninsula. The forest is cleared by felling the large timber trees and burning off all that remains, the greatest care being taken to prevent the soil being washed away by heavy downpours of rain. In fact, it is necessary to grow temporarily some cover crop to prevent this soil erosion. The rubber trees do not start to bear until about the seventh year, and the full yield is not obtained till some years later. Malaya supplies more than one-third of the world's rubber.

Amongst other plantation crops may be mentioned coconuts, which thrive especially on the sandy soils of the coastal districts, and the African oil palm, which, though only recently introduced, has great possibilities. The cultivation of pineapples is centred at Singapore. Pineapples, it is interesting to notice, thrive on poor soil; rich soils produce larger fruit but with a poorer flavour. Many other crops are suited to Malayan climatic conditions, and extension in the near future is probable.

Mining. Rubber is one great mainstay of Malayan prosperity, the other is tin-mining. Nearly all the tin mined at present in Malaya is alluvial tin, as lode mining for the mineral *in situ* is only in its early stages; yet even so Malaya produces nearly one-third of the tin of the world. The richest deposits are found in the valleys of the west, and the tin ore is obtained by excavating the gravel of the valleys, washing away the lighter material, and so leaving behind the very heavy tin ore. Much of the excavating is carried out by hand, especially by Chinese labour, but in such a wet land as Malaya it is also possible to employ dredges, whilst in other cases the gravel is pumped out together with large quantities of water or washed out of place by turning a huge jet of water on to the deposit. The tin ore is sent to Singapore and Penang to the big smelteries before being exported as tin.

Population and Development. A few years ago it could be said that the population of Malaya consisted roughly of one-third Malays, one-third Chinese, and rather less than one-third Indians, with a sprinkling of Europeans and Eurasians. The Malays are the indigenous cultivators, living mainly in rural districts, the Chinese supply most of the labour for the mines and also form the shop-keeping and artisan classes in the towns, whilst the Indians supply the coolie labour for the rubber plantations. Later the proportions were changed by the enormous immigration of Chinese, in some years more than 300,000 Chinese arriving at the port of Singapore alone. Ninety per cent. of the total population of Malaya is now Malay and Chinese in about equal proportions but with most of the Chinese in the towns.

The largest towns are the two great ports, both on islands, namely, Singapore and Penang. The island of Singapore is about 27 miles long and 14 miles wide, the town being situated on the southern side. The British owe the possession of this valuable island to Sir Stamford Raffles, who purchased it in 1819 for about £4,000. At that time it was practically uninhabited, and owes its present importance mainly to its geographical position at the meeting of the world's great trade routes from east to west, at the same time being favoured with a magnificent anchorage. It is fortunately separated from the mainland only by a narrow strait, across which a causeway, utilized by the railway and a road, has been built. The population of Singapore island is over a million. Penang, the other great port, also on an island about half the size of Singapore, handles much

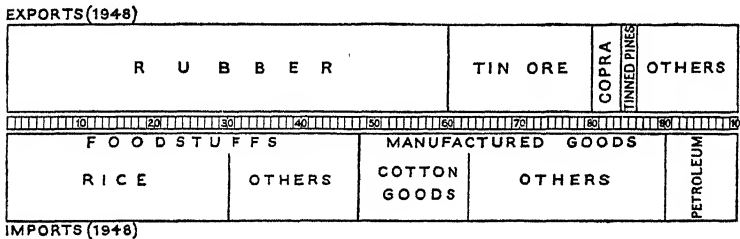


FIG. 252.—The foreign trade of Malaya.

of the import and export trade with Europe, being nearer Europe than Singapore. The old town of Malacca on the mainland, formerly one of the Straits Settlements, is now comparatively unimportant, although it is the oldest European settlement in the East, having been founded by the Portuguese as long ago as 1511. The principal inland town of Malaya is the capital, Kuala Lumpur, near the centre of the tin-mining region and a short distance from its own port, Port Swettenham. Ipoh is another tin-mining centre.

Fig. 252 shows the trade of British Malaya as a whole, and emphasizes the overwhelming importance of rubber and tin amongst the exports. The large proportion of rice shown among the imports should also be noted. The bulk of the foreign trade passes through the ports of Singapore and Penang.

INDONESIA

The former Dutch possessions in Asia include the greater part of the East Indies, except only the northern and north-western parts of Borneo, which are British, and the eastern half of Timor, which is Portuguese. The Dutch have retained the western half of New

Guinea, though this island is considered usually with Australia. The total area of the islands now comprised in Indonesia is about 600,000 square miles, and the population roughly 80,000,000. The Netherlands East Indies fell naturally into two parts:

(a) Java and Madura, with an area of only 51,000 square miles but with 42,000,000 people (1930 Census—now probably 60,000,000).

(b) The Outer Territories, area 550,000 square miles, population only 18,700,000 (1930 Census—now probably 30,000,000).

In other words, Java affords a splendid example of a land with an equatorial type of climate, which has been highly developed, whilst the Outer Territories are only in the early stages of modern economic development.

From 1941 to 1945 the East Indies were occupied by the Japanese. After liberation, the Republic of the United States of Indonesia was established and gradually became strong enough to control by 1950 all the former Netherlands East Indies except the South Moluccas and New Guinea. The Dutch recognized the new republic and transferred the administration on a friendly basis on December 28, 1949.

Like Malaya, Java has an excellent system of roads and railways, converging on the three chief ports of Jakarta—formerly Batavia (with a fine modern harbour five miles to the east at Tanjung Priok)—Semarang, and Surabaya. Jokjakarta and Surakarta are towns in central Java with over 100,000 inhabitants each.

Sumatra. The large island of Sumatra consists of a mountainous volcanic backbone on the west and a broad stretch of undulating or low land on the east. The population of six million is rapidly expanding and there are numerous Javanese and Chinese immigrants. Rubber, palm-oil, tea, and tobacco are leading crops and Sumatra has important oilfields.

Singkep, Banka, and Belitong. These little islands form a continuation of the mountains of Malaya, and it is from these islands that most of the tin ore of Indonesia is obtained.

Bali and Lombok are small islands east of Java, which in general they resemble.

Indonesian Borneo is for the most part thinly populated and economically undeveloped. Oilfields have recently become important.

Celebes, though very mountainous, has soils and a climate resembling that of Java, and the export of copra and macassar oil (from Macassar), coffee and spices (from Menado) is capable of wide expansion.

The Molucca Islands are the famous Spice Islands which were the object of so many of the medieval explorers.

Western New Guinea, renamed Irian, is very undeveloped.

BRITISH BORNEO

General. The territory under British influence in Borneo occupies about a quarter of the island and is organized in three units:

- (1) The Colony of North Borneo (29,000 square miles).
- (2) Brunei (2,226 square miles).
- (3) Sarawak (50,000 square miles).

The island of Labuan, lying off the coast of Brunei, is included in the Colony of North Borneo.

The *Colony of North Borneo* until 1942 was under the jurisdiction of the British North Borneo Chartered Company—just as India was in the old days under the East India Company. It became a Crown Colony in 1946. The country can be divided into three strips:

(a) The coastal plains—grass-covered alluvial stretches suitable for rice and other crops, fringed on the seaward side by mangrove swamps.

(b) The foothills or downs—a zone of low hills sometimes fertile and cultivated, at other times swept bare of soil by heavy rains.

(c) The hills—consisting of range after range, densely forested, trending north and south and rising higher and higher till they reach over 6,000 feet.

The climate of North Borneo is typically equatorial, the temperature of the coastal belts averaging about 80°. It is possible, however, to distinguish two seasons, the season of the north-east monsoon from October to April, which is the principal rainy season, and the season of the south-west monsoon, which is drier.

The population is about a third of a million, and consists mainly of Chinese and Mohammedan settlers on the coast and aboriginal tribes inland. The chief mainland towns are Sandakan on the east coast and Jesselton on the west coast; on the island of Labuan is the port of Victoria. The country as a whole, as these figures will suggest, is very undeveloped, but in the boom years there was a rapid rise in the production and export of plantation rubber and tobacco, and still more recently the oilfields of the foothill belt have assumed a very considerable importance. The foreign trade is carried on mainly through Singapore and Hong Kong. Rubber is easily the chief export; other products include timber, hemp, and copra. Rice, textiles, and clothing are imported.

Brunei is a small state under the rule of a native sultan with a British resident as adviser. It is divisible into the same three physical regions as the Colony of North Borneo, and the products are similar. In recent years there has been a great development of mineral oil.

Sarawak is a state which was ruled with pure autocracy by an English rajah (of the Brooke family) from 1841 to 1946 when it became a British Colony. There is the same three-fold division as in British North Borneo, and some small oilfields are situated on anticlines in the foothill belt, the town of Miri being the headquarters of the oilfields. Other towns are the capital Kuching and Sibü, both on navigable rivers. The agricultural products include sago, pepper, and plantation rubber; in recent years rubber and mineral oil have represented three-quarters of the total value of the exports. Again the trade is mainly carried on through Singapore.

THE PHILIPPINE ISLANDS

The Philippine Islands have an area of 114,000 square miles, or rather less than that of the British Isles, but the total is made up by over 7,000 distinct islands. The Filipino people, who are racially allied to the Malays number roughly 19,000,000. The Philippine Islands stretch from about Lat. 20° N. to 5° N., and they lie almost entirely outside the equatorial belt.

The principal food crops are rice and maize, but the Philippines do not produce enough for home consumption. The great cash or export crops are abaca or Manila hemp, coconuts, sugar-cane, and tobacco, with rubber of increasing importance in the south. Manila hemp is a hard-fibred hemp much used in rope making and is obtained from the stems and leaves of a plant closely resembling the banana. Practically the whole of the world supply comes from the Philippine Islands and constitutes nearly a quarter in value of the exports of the islands. Coconut products now form the leading export, and the islands may be classed as the leading country in the world in this trade, the output of copra and coconut oil representing in recent years more than a quarter of the world's total. Coconut plantations are most important where the rainfall is well distributed and typhoons are absent, that is, in the central and southern parts of the east coast. The improvement in the local oil mills has resulted in a very large increase in the export of coconut oil as compared with copra. Sugar-cane cultivation has recently been carried on under improved conditions, and the export of sugar and molasses is now over a million tons.

The Philippine Islands were ceded by Spain to the United States in 1899 after the Spanish-American War and the United States promised the Filipinos self-government as soon as the country should be able to control its own affairs. Consequently the "Commonwealth of the Philippines" came into being in 1935 with a Filipino President and an American High Commissioner. The country was attacked by the Japanese in 1941 and occupied by them until liberated in 1945. The Philippines have now become an independent republic.

THE CHINESE REPUBLIC

In 1912 one of the world's oldest empires—the Empire of China—became a republic. The old Chinese Empire included the rich, thickly populated region of China Proper and Manchuria, together with the huge but less important “outer territories” of Sinkiang or Chinese Turkistan, Tibet, and Mongolia, the last two largely desert. The whole area of the old Empire was about $4\frac{1}{2}$ million square miles, of which China Proper was about 1,533,000 and Manchuria 364,000.

In 1928 the capital of the Republic was moved to Nanking so that Peking, which means northern capital, was renamed Peiping. A few years later Japan invaded and conquered Manchuria, setting up a puppet state which they named Manchukuo. In 1937 the Japanese invaded China Proper and gradually spread over most of the country whilst the Chinese government moved to Chungking. After the defeat of Japan in 1945 civil war broke out and the Chinese Communists by 1950 controlled the whole country except the island of Formosa. They again made Peking the capital.

CHINA PROPER

Position and Size. China, within the Great Wall, is about the same size as India and Pakistan, and has at least the same number of people, probably many more. Actually, however, one is justified in saying that China is much more densely populated than India, for the proportion of habitable land is much less. China, in contrast to India, lies almost entirely outside the Tropics. The Great Wall of China, built thousands of years ago by the Chinese as a protection against raiders from Mongolia, still marks roughly the northern limit of China Proper.

Physical Features. Broadly speaking, China Proper lies to the east of the great series of plateaus which constitutes the heart of the continent. Excluding Manchuria, the country may be considered as consisting of three great river basins—the basins of the Hwang Ho, the Yangtze Kiang, and the Si Kiang. These fundamental geographical divisions are useful because they correspond with the popular division of the country into North China, Central China, and South China. The Hwang Ho and the Yangtze Kiang both rise amidst the mountains of the high plateau of Tibet, and their upper courses lie outside China Proper. Nearly the whole of the Si Kiang basin, on the other hand, lies within the confines of China itself. In the north-west China includes a considerable portion of what is geographically a part of the Mongolian plateau. Separating the Hwang Ho and the Yangtze basins, and the Yangtze and Si Kiang basins are important offshoots of the central mountainous mass of Asia.

Geology and Minerals. Broadly speaking, the south of China is constituted by a mass of old rocks, but coal-bearing rocks occur in basins amongst older rocks; the north of China includes larger stretches of sedimentary rocks. Though as yet little developed there is no doubt that China is fairly rich in minerals. China may be regarded as one of the first coal countries of the world, and coal occurs in most of the eighteen provinces as well as in Manchuria. The output has recently increased greatly—to over 100,000,000 tons,

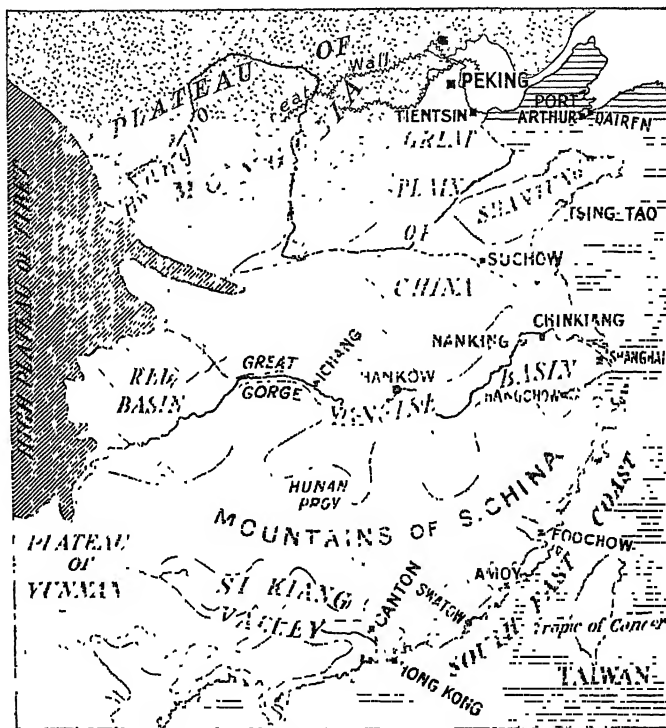


FIG. 253.—The natural regions of China.

of which most is now from modern mines. The huge field underlying Shansi and part of Shensi probably rivals the Pennsylvanian field in size and potential importance. Part of the Shansi field is anthracitic. Iron ore is not as abundant as was formerly thought, and 90 per cent. of the reserves are now in Manchuria. Amongst the leading deposits now being worked are those of Tayeh, near Hankow. China's present output of iron ore is probably about 10,000,000 tons a year. It is interesting to notice that modern coal and iron ore mining is practically restricted to the area served by railways. A little petroleum is obtained in Shensi, but conditions

generally are not suitable in China. Yunnan Province is probably one of the richest copper districts in the world; tin is mined in south-western China. China had almost a world monopoly in the production of antimony—two-thirds of the world's total, mostly from Hunan. Gold, silver, lead, molybdenum, and bismuth are amongst other minerals produced in China.

Climate. In winter atmospheric conditions in China are dominated by the mass of cold heavy air over the heart of the continent. In contrast to India, China is not shut off from the interior by any great chain of mountains. Consequently in winter strong, cold winds blow outwards from the interior. Over Northern China they are particularly strong, giving rise to the well-known and much

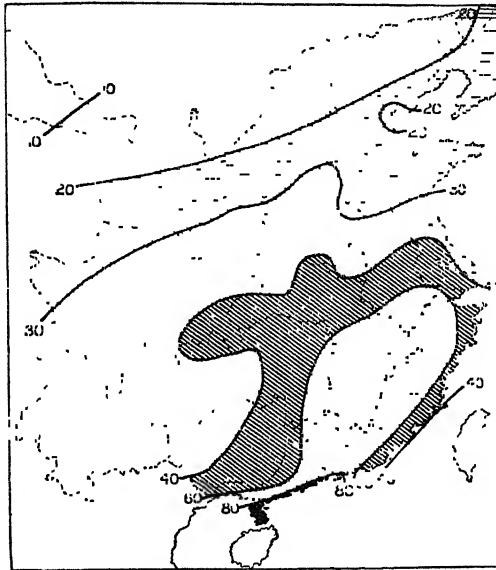


FIG. 254.—The mean annual rainfall of China in inches.

hated dust storms. The whole of Northern China is below freezing in winter, the January isotherm of 32° F. reaching its southernmost limit in the Northern Hemisphere. Frost and snow are usual, except in Southern China. Except along the Yangtze Basin, where winter cyclones give rise to a little rain, and along the S.E. coast, the cold season in most of China is one of clear skies and rainlessness.

In summer, depressions form in the interior and the summer monsoon blows in from the south and south-west—warm and moist. The summer winds are rarely as strong as the winter winds—a direct contrast with India—but May to September is the rainy season, as in all parts of monsoon Asia. In July there is little

difference in temperature between North China and South China. Peking averages 79° , Hong Kong 82° .

China thus falls into the following climatic provinces, which correspond with the physiographical divisions:

South China has a tropical monsoon climate with a good rainfall, but with colder winters (over 58° F. in January, however) than are experienced in India.

Central China has cold winters and warm, wet summers with a moderate rainfall, but with local winter rains. The average temperature in January is above freezing.

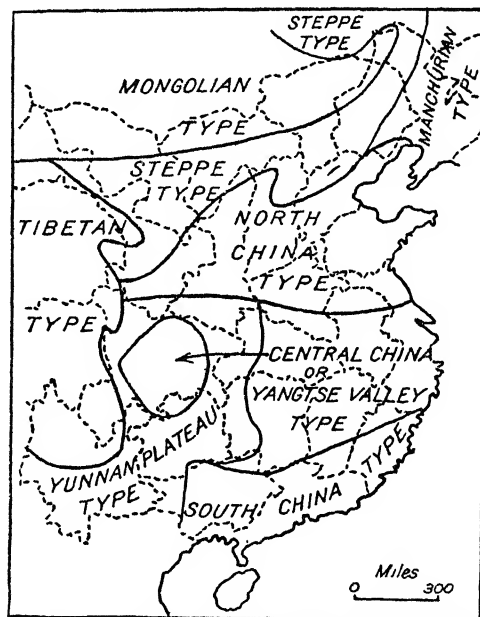


FIG. 255.—The climatic regions of China.

North China has winters below freezing, with strong dust-laden winds and hot, wet summers, but with a rainfall generally below 40 inches.

South-West China has the “Yunnan Plateau type” of climate—cold in winter and swept by cold winds.

North-West China (along the edge of the Mongolian Loess Plateau) has a steppe type of climate.

Natural Vegetation. In few countries of the world has the natural vegetation been removed as completely as it has over much of China. The barren, eroded hills so characteristic of much of China suggest a rocky, desert country rather than one which should, properly, be clothed with good forest growth. Only in a few parts,

such as the hills of the south-east, is there still a good forest growth.

Agriculture. Like India, China is essentially an agricultural country and is, broadly speaking, self-supporting in the matter of foodstuffs. But China includes a far larger proportion of mountainous country not suitable for agriculture than does India, with the result that the valleys and other fertile regions are very densely populated. It is estimated that in some areas 3,000 people and 1,000 animals find their sustenance in a single square mile of land. Taking China as a whole there is rather less than 0.4 acre of cultivated land per person. The two great achievements of the Chinese farmers have been the maintenance of soil fertility and the development of a highly specialized system of crop rotation. The former has been accomplished largely by the utilization to the utmost of human manure and by such laborious processes—possible only where labour is super-abundant—as the actual mixing by hand of different soils. Every farm is really a large garden and not only is multiple cropping adopted but every spare inch of land is utilized.

Three-quarters of all the cultivated land in China is occupied by the three chief food grains—rice, wheat, and millet.

Rice is the dominant, almost the sole food crop in Southern and South-Eastern China. The yield averages 1,750 lb. per acre. In Central China rice and wheat share the premier position as food grains; in Northern China there is little rice.

Wheat. Very little wheat is grown in Southern China; in Central China it is an important crop; in Northern China and Manchuria it tends to become the leading crop.

Millets tend to become the dominant grain where the rainfall is less than 40 inches per year, being concentrated in Northern China and Manchuria. The better lands in these drier tracts are occupied by wheat, and soya beans now occupy much of the land formerly given to millets.

Other food crops in the south include sugar; in the north maize, peas, and beans. Tea is cultivated in the south and west.

Cotton is grown widely in Central and Northern China, the chief area of production being the Yangtze valley.

Other fibre crops include hemp, jute, and ramie. Mulberries and oaks are reared for agricultural purposes.

Animals. The millions of horses and mules in China and Manchuria are mainly in the drier north, where they can be used as pack animals. Cattle in China are primarily draft animals, since the Chinese use little beef and make but slight use of milk or dairy produce. Fat pork, on the other hand, is a favourite foodstuff, and there are estimated to be 60,000,000 pigs in China. Sheep, primarily reared for their coarse, inferior wool, are most numerous in the north and west. Poultry are abundant and egg products form a leading item of export. Sericulture is especially important

in Central China and Shantung, and China probably produces more silk than the whole of the rest of the world, but the former importance has disappeared with the world development of artificial silk and nylon.

Manufactures. Native looms are found in most Chinese villages, but an important feature in the development of modern China is the erection of cotton, wool, and silk mills in Canton, Shanghai,

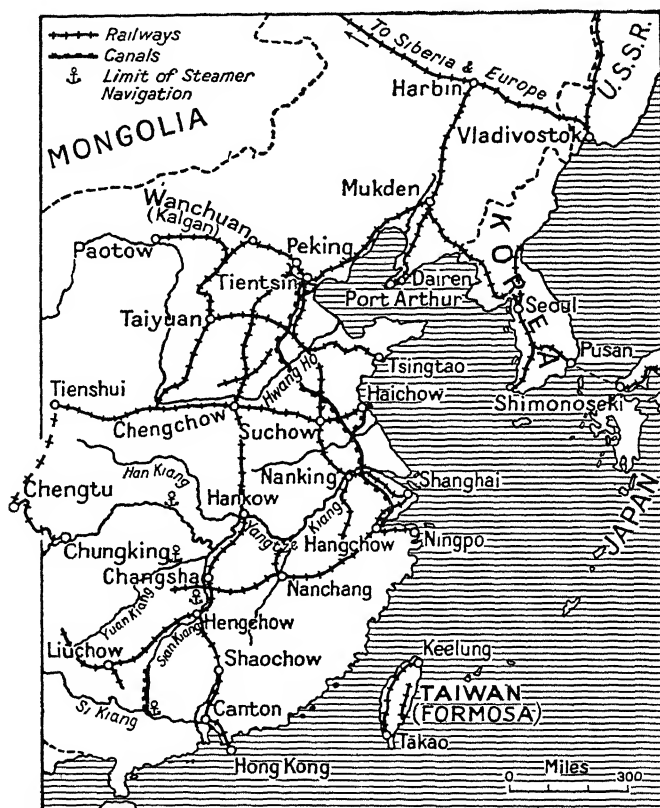


FIG. 256.—The railways, navigable waterways, and canals of China.

and other great centres. In January, 1933, there were 128 cotton mills in China with 4,500,000 spindles and 43,000 looms. Forty-one of the mills, but nearly half the spindles and looms, were then Japanese owned. The production of cotton piece-goods exceeded $2\frac{1}{4}$ million tons and there was a considerable export. Especially since 1951—the beginning of the first five-year plan, industrialization has been spectacular. By 1957 there were said to be 24,000,000 factory

workers in industries of all sorts including great iron works as at Hanyang, near Hankow, using the Tayeh iron ores.

Population. A census, as understood by western nations, had never been taken in China, and it is still difficult to know the exact population, although in June 1954 the results of a count in 1953 were broadcast. The total was said to be 589,000,000 in the whole of China, including Taiwan, and 12,000,000 abroad. Most of the population is concentrated on the plains and in the valleys below the 2,000-foot contour line.

Communications. The Yangtze and its tributaries form the great highway of communication in Central China; the Grand Canal and the network of small canals in the Yangtze delta connect it with the Great Plain. In South China the Si Kiang is important. The railway system is still quite inadequate, though the long-promised connection between Hankow and Canton was completed in 1936. Over most of the interior primitive forms of transport by human porters and by wheelbarrow are the only means available, but remarkable progress is being made with road making. Motor buses ply regularly between many of the larger towns. Regular air services now link towns which were formerly days or even weeks apart.

For many years China had little interest in foreign trade but agreed to open certain ports to foreign nationals for trading. Britain, France, the United States and other countries had "concessions" or tracts of land which they controlled in many of these "Treaty Ports," but all such rights have now been surrendered—the last in 1945.

Foreign Trade. Since the invasion of China by Japan in 1936–37, followed without a break by the Second World War and then by civil strife, there has been little opportunity for normal trading.

The Communist government which controls the whole of China except Taiwan or Formosa, has close ties with the Soviet Union but little connection, either politically or commercially, with the outside world.

THE NATURAL REGIONS OF CHINA

The Loess Plateau of the North-West (Shansi, Northern Shensi, and Kansu). In the north-west of China the original topography of the country has been obliterated by a great mantle of wind-blown dust or loess, through which only the higher ranges of hills appear. Each loess-filled basin forms a "hsien" or county, with the county town in the centre. Rivers and roads alike have cut deeply into the soft loess, and the loess plateau has become a land of sunken roads which, viewed from the surface, appears uninhabited except for an occasional cultivator; for the dwellings are dug out of the loess walls of the roads—warm and dry in winter, cool in summer. The

natural fertility of the loess is great, but the rainfall is irregular and this part of China is less densely populated than most. This region occupies part of the Plateau of Mongolia shown on Fig. 253.

The Wei Ho Valley. This small but important region lies between the loess-covered plateau to the north and the Tsin-ling mountains to the south, occupying the central part of Shensi round the provincial capital of Si-an. A fertile, loess-covered valley, the special claim of this densely populated area is that it claims to be the cradle of Chinese civilization.

The Great Plain of North China. Lying between the edge of the loess plateau on the west and the Gulf of Pe-Chih-li or the Shantung highlands on the east, the Great Plain of North China occupies a large part of the province of Hopei, the western portion of Shantung, and the north-east of Honan. Originally occupied by a shallow sea, the plain is built up of a series of marine gravels with a superficial coating of alluvium. The latter consists really of re-deposited loess laid down by numerous streams, including the Hwang Ho itself, which flow down from the plateau. In their passage across the plain there is but a slight fall and the great burden of fine sediment is deposited in the bed of the river. In order to confine the rivers, mud and straw embankments, sometimes faced with masonry, are built on either side and gradually the rivers come to flow between high banks and the water-level is well above that of the surrounding plain. Breaches resulting in disastrous floods and constant changes in the courses of the rivers are inevitable. The rivers are a curse rather than a blessing, and the name of China's Sorrow, often applied to the Hwang Ho, is indicative of the state of affairs. But the fertile soil and the hard cereals (millet and wheat) afford a more nutritious diet than the rice of the south. Further, the vigorous winters have helped to make the Northern Chinese a fine sturdy people. In the days of old the Hopei plains were continually the prey of Mongol raiders from the plateau, but now it is the plain dwellers who are the aggressors and are pushing settled agriculture farther and farther on to the plateau. *Kalgan* is the centre of this new agricultural land. The position of *Peking* demonstrates the fear with which the raiders used to be regarded and which necessitated the building of a capital in such a position as to serve as a base against them. *Tientsin*, on the navigable Pei Ho, is the principal port of the Great Plain.

The Shantung Peninsula. The Province of Shantung, excluding the western strip which forms part of the Great Plain of North China, consists of a mass of ancient mountains rising like an island from the plain on the west and the sea on the east. The commanding position of the Peninsula and the excellence of the few natural harbours in its rocky coast attracted the attention not only of Russia and Japan but also of the European powers who had

interests to protect in the Pacific. Germany transformed the fishing village of Tsing-tao into a great port; the British leased Wei-hai-wei as a protective measure against the Russian occupation of Port Arthur. The hills of Shantung are barren and almost completely deforested; the valleys are densely populated and intensive agriculture is practised to the full. Sericulture is important. The sturdy Shantungese emigrate temporarily to Manchuria and to Shanghai, and are more mobile than the Chinese of the interior.

The Szechuanese Alps. The mountainous regions of the far interior are very sparsely populated by comparatively primitive people. The region lies west of the Red Basin.

The Red Basin. Occupying the heart of the province of Szechwan, the Red Basin is one of the most remarkable natural regions in the world. Hemmed in on all sides by a girdle of mountains, the basin was occupied in Tertiary times by a great lake in which were laid down the red sandstones from which the basin derives its popular name. When the lake was drained the outflowing stream cut the famous gorge between Kwei-chow and I-chang. The numerous streams in the basin have cut deep gorges through the sandstones into the old rocks below. The four leading north and south valleys comprise the richest agricultural land of the "Province of the Four Streams" (Szechwan). The whole of the Red Basin, with the exception of the Chengtu plain, is thus divided up into steep-sided ravines and ridges. But it is well watered, and the hillsides have been terraced from base to summit. The farmers of this densely populated region produce a varied succession of crops—rice, wheat, maize, beans, sugar, hemp, and tobacco, whilst oranges are widely grown, and silk is one of the leading products of the region. Despite its interior situation, the climate of the Red Basin is warm and damp and the winters are milder than in most parts of China. Coal is abundant and crops out on the hillsides.

Chungking, on the Yangtze, is the chief city and has over a million people.

Though lying within the limits of the Red Basin, the Chengtu plain is distinctive in character from the remainder, and consists of a broad, irrigated plain watered by the Min River. The density of population made possible by irrigation is almost incredible—more than 4,000 to the square mile in places.

The most remarkable feature of the whole Red Basin is its inaccessibility. Almost the only exit or entrance is by the Great Gorge and the region as a whole is self-contained and self-supporting.

The Central Basins. It is probable that the waters of the Yangtze, emerging from the gorges which cut off the Red Basin from the rest of China, originally found their way to the Pacific Ocean through a series of lakes. The flat alluvial stretches of the Central Basins represent the floors of these infilled lakes. In each of them, indeed,

there still exists a fragment of the ancient lake and in times of severe flood the whole countryside reverts again to what must have been its prehistoric character.

The Upper Basin is the largest and lies to the north and south of the Yangtze, partly in Hupeh and partly in Hunan.

The Middle Basin is similarly divided into northern and southern portions by the Yangtze.

The Lower Basin is less distinct and lies mainly north of the river.

The basins are surrounded by a tangle of mountains stripped bare of their original forest cover. Broadly speaking, wheat, barley, or cotton are dominant crops to the north of the Yangtze; rice to the south; tea and oilseeds grow on the slopes of the surrounding hills. The great highway of the natural region is the Yangtze and the whole centres on the great triple city of Hankow-Wuchang-Hanyang, often called Wu-han.

The Yangtze Delta. The delta corresponds roughly with the province of Kiangsu. The whole is a vast alluvial plain and has been described as the "Holland of China," being traversed by canals in all directions. The principal food grain is rice, but mulberry trees line the canals, and this is the leading silk region of China. Much cotton is also grown and supplies the Shanghai mills as well as a surplus export to Japan. *Nanking* and the great port of *Shanghai* (just off the mouth of the Yangtze) are the two chief centres of the region.

The South-East Coast. This region corresponds roughly with the provinces of Chekiang, Fukien, and eastern Kwangtung. Backed by high mountains, the region is geographically isolated; the outlook of the people is towards the sea; in customs, as well as in many other ways they stand apart from the rest of the country. Rice is the crop in the valleys; tea gardens, orange, lemon, and mulberry groves cover the lower terraced slopes of the hills, the higher parts of which are still forested. Ningpo, Foochow, Amoy, and Swatow are the chief towns and ports, and from these there is a stream of emigration to Malaya and the East Indies.

The Si Kiang Basin. The entrance to this great region is guarded by Canton and Hong Kong. It is the great rice-growing area of China; densely populated valleys are surrounded by bare deforested hills. Canton was affected by foreign trade long before the remainder of China was open, and most of the Chinese found abroad are Cantonese or southern Chinese.

The Yunnanese Plateau. Yunnan is a wind-swept plateau about the size of the British Isles but with a population of only 6-7,000,000. The valleys are fertile but unhealthy, so that the cultivators often live in villages perched high up above their fields. The natural resources are great—especially in minerals—but are as yet but little touched.

MANCHURIA

The land to the north-east of China Proper has long been known to Europeans as Manchuria—the land of the Manchus. The Manchus were nomadic tribesmen who conquered China in A.D. 1644 and ruled until the overthrow of the Empire in 1912. But the conquerors intermarried with their subjects and became Chinese in custom, culture, and physique; Chinese settlers in Manchuria itself likewise absorbed the Manchus who, accordingly, no longer exist. But it was not until 1907 that Manchuria was declared part of China Proper, as the viceroyalty of the “Three Eastern Provinces.” For Czarist Russia, expanding ever eastwards towards the Pacific, Manchuria was to be the eastern outpost of her empire, since her own port of Vladivostok is ice-bound in winter. But Japan with only limited resources and an overflowing population had a vital interest in Manchuria as a granary and source of raw materials. Russia developed Northern Manchuria and built the great city of Harbin; Japan, after her victory over Russia in 1904–5, secured the rights to construct the South Manchuria Railway and to develop the country in the south. During the Chinese Civil War which broke out about 1922 peace was preserved in Manchuria by Japan. As the Chinese Government at Nanking became more firmly established and secure, it sought to re-establish Chinese authority over Manchuria, but the Japanese had other plans. In February, 1932, the “Three Eastern Provinces” (Fengtien, Kirin, and Heilungchiang) together with Jehol were proclaimed an independent state under the title of Manchukuo with a capital at Hsinking (Chang-chun). Japan controlled the state till the end of the Second World War in 1945 when it again became part of China and is now essentially part of Communist China. The five new provinces which have been set up have a total area of a third of a million square miles and a population of over 45,000,000.

Physically Manchuria consists of three parts. There is a great central plain, narrow in the south where it is drained by the lower course of the Liao Ho and by the Hun Ho, broad in the north where it stretches from the Khingan scarps on the west to the forested mountains on the east. This broad northern plain is drained by the tributaries of the Sungari.

The climate of the plains is not unlike that of the Canadian prairies—very cold winters, hot summers, with the rainfall mainly in the early summer. The climate is rigorous but healthy and one specially suited to cereal farming. The growing season over the whole plain is over 120 days, and so is ample for wheat.

Soya or Soy beans form the leading crop. The bean has long been an important food in China, but only within the last 30 years

has been known in Europe and America. Much of the export has been to Japan; the beans can be used as vegetables, or cooked in a variety of ways as soups, sauces, and breakfast foods; from the oil margarine and other foods as well as soaps, glycerine, explosives, celluloid, and paints can be made. Kaoliang and millet are the staple foods of the native population; wheat is a crop of the northern part of the plain as maize is of the south. Rice is grown mainly by Korean immigrants.

Amongst the minerals which were important to Japan coal and iron ore are the chief. The coal mines are at Fushun and Yentai, the iron and steel works at Anshan.

CHINESE OUTER TERRITORIES

Practically the whole of the dry interior of Asia—sometimes referred to as the Dead Heart of Asia—formed nominally a part of the Chinese Empire. The political ties between these vast tracts and the present Communist Government of China vary in importance. Tibet has become a satellite, Chinese Turkistan is definitely Chinese; Inner Mongolia is nominally autonomous; Outer Mongolia is a republic on the Soviet model; Tannu Tuva to the north-west a republic under Soviet protection.

The vast indefinite tract of country known as Mongolia comprises the north-eastern half of the great central plateau of Asia, stretching to Siberia on the north, Manchuria on the north-east, China on the south-east, and Chinese Turkistan on the south-west. The total area approaches 2,000,000 square miles, the population is probably under a million. From the broadest possible point of view it consists of the great Desert of Gobi in the centre with a fringe of dry, grassy steppelands to north and south-east. The surface comprises a succession of great basins called talas, within which are a series of smaller basins (gobis).

The climate of the country is severe in the extreme. In winter the temperature may drop to 40° or even 50° below zero, whilst the summer is but short, and over the whole area the precipitation is very small.

At the present time a distinction is drawn between Inner Mongolia, which fringes China and for all intents and purposes is a part of China, and Outer Mongolia, inhabited by nomadic steppe-dwellers, which like the smaller Tannu Tuva, is a republic. The centre of the innumerable caravan routes is the town of Urga in Outer Mongolia, 170 miles south of the Siberian town of Kiakhta. On the Chinese side the starting-point for most of the trade routes is the railway town of Kalgan. Prior to the 1936–45 war between Japan and China the most marked feature in development during the present century had been the peaceful invasion of the borders of Inner Mongolia by Chinese agriculturalists; also, the slow tedious caravans of the

wide stretches of Outer Mongolia were already being replaced by motor transport.

TAIWAN (FORMOSA)

Formosa, called Taiwan by the Japanese, became part of the Japanese Empire after the China-Japan War in 1895. It was carefully developed by Japan; mining and agriculture progressed steadily. Formosa was the tropical possession of Japan and hence was able to provide a supply of raw materials and foodstuffs which could not be produced elsewhere in the empire. Of these sugar, maize, jute, and camphor were the chief. Rice and tea were produced and exported. Mining also made steady progress; in 1952 the production of coal was $2\frac{1}{4}$ million tons. The island has an area of 14,000 square miles and a population of about 10,000,000. All Japanese settlers have now been repatriated. The eastern half of the island (except a narrow coastal strip) is a mountainous area inhabited by aboriginal tribes allied to the Malays.

After restoration to China in 1945, Formosa became the last stronghold of the Chinese Nationalist Government when the Chinese Communists were victorious in the civil war.

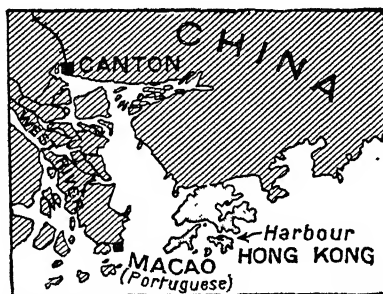


FIG. 257.—The position of Hong Kong.

HONG KONG

Near the mouth of the Canton, or West River, lies the small island of Hong Kong, which has been a British Possession since 1841. The island is separated from the mainland by a strait only half a mile wide, and on the shore of the mainland is Kowloon, part of the colony. In addition a considerable piece of the mainland has been leased to Great Britain. The strait between the island and the mainland forms a wonderful harbour, and Hong Kong is visited by 33,000 vessels yearly. Hong Kong is a free port, there are no customs duties, and much of the trade of South China normally passes through Hong Kong. In value the trade of Hong Kong is

comparable with that of the Dominion of New Zealand, but it is mainly a transit or entrepôt trade. The rich Chinese merchants have long been safer there under British rule than in China, and nearly 3 million Chinese live on the island or in Kowloon. There are also shipbuilding yards, sugar factories, textile mills, tin refineries, paint, cement, and tobacco factories.

The island was occupied by the Japanese from 1941 to 1945 and much destruction resulted. The island itself is only 32 square miles (the whole colony 391 square miles) but the population of 850,000 in 1931 reached 2,250,000 in 1952 after falling to 600,000 during the occupation. In 1952 over 2,600 aircraft arrived on international flights; in 1959 a magnificent new airport with runways built out on to made ground reclaimed from the sea was opened.

JAPAN (NIPPON)

Japan proper consists of a group of islands off the east coast of Asia. There are four main islands—Honshu or Mainland, Shikoku, Kyushu, and Hokkaido or Yezo—and some 4,000 small ones including geographically the Kuriles strung out to the north-east and the Ryukyu or Luchu to the south-west. In the course of half a century of expansion and aggression Japan acquired Korea or Chosen, Taiwan or Formosa, and Karafuto or southern Sakhalin, so that by 1931 the Empire covered 261,000 square miles with over 90,000,000 people. Japan then invaded and seized Manchuria and in 1937 invaded China proper. On December 7, 1941, Japan made an unheralded air attack on American (and later British) bases in the Pacific, notably Pearl Harbour in Hawaii where a large part of the American Pacific Fleet was crippled. After this initial success Japanese forces swept over much of south-east Asia, occupying the Philippines, East Indies, Malaya, and Burma. Allied forces gradually regained control and after extensive bombing of Japan itself, the Japanese surrendered unconditionally on August 15, 1945. Manchuria and Formosa were restored to China, Korea (occupied at first by Russian troops in the north and American in the south) was promised independence. Japan itself was occupied mainly by American troops. The occupation lasted until 1952 when the peace treaty was signed giving Japan control once again over what is here called Japan proper. The Kuriles were assigned to the U.S.S.R.

JAPAN PROPER

Position and Size. Post-war Japan extends from 30° N. to 45° N., so that the whole is nearer the equator than are the British Isles; 135° E. runs through the centre of the kingdom. The largest island of Japan (Mainland or Honshu) is almost exactly the same size as the largest island (Great Britain) of the British Isles, but Japan

Proper is larger than the British Isles. The area is about 142,000 square miles with over 92,000,000 people in 1958.

Physical Features. Nearly all parts of Japan are mountainous, and at first sight the arrangement of the mountains is irregular. Broadly, however, two parallel chains of mountains may be distinguished, each forming a long curve. The one curve lies close to the

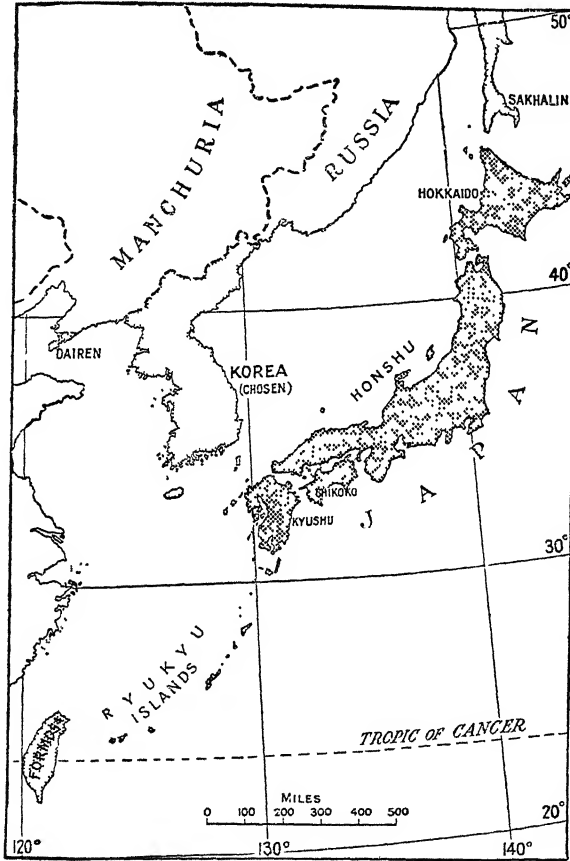


FIG. 258.—The former Japanese Empire.

Japan proper is shown by the dark tint.

west coast, the other to the east coast. The midland valley which lies between the two chains is most clearly marked in the south-west, where it is occupied by the famous Inland Sea. Elsewhere it is obscured by great volcanic piles, the volcanoes showing a tendency to lie along lines at right angles to the folded chains. There are numerous volcanoes in Japan; the most famous being Fuji Yama (Mount Fuji) over 12,000 feet high, and the sacred mountain

of the Japanese. Many other peaks rise to over 7,000 feet. Japan is, then, a very mountainous country—indeed, the only extensive plain lies around Tokyo. As a result only about one-fifth of this densely populated country is capable of cultivation.

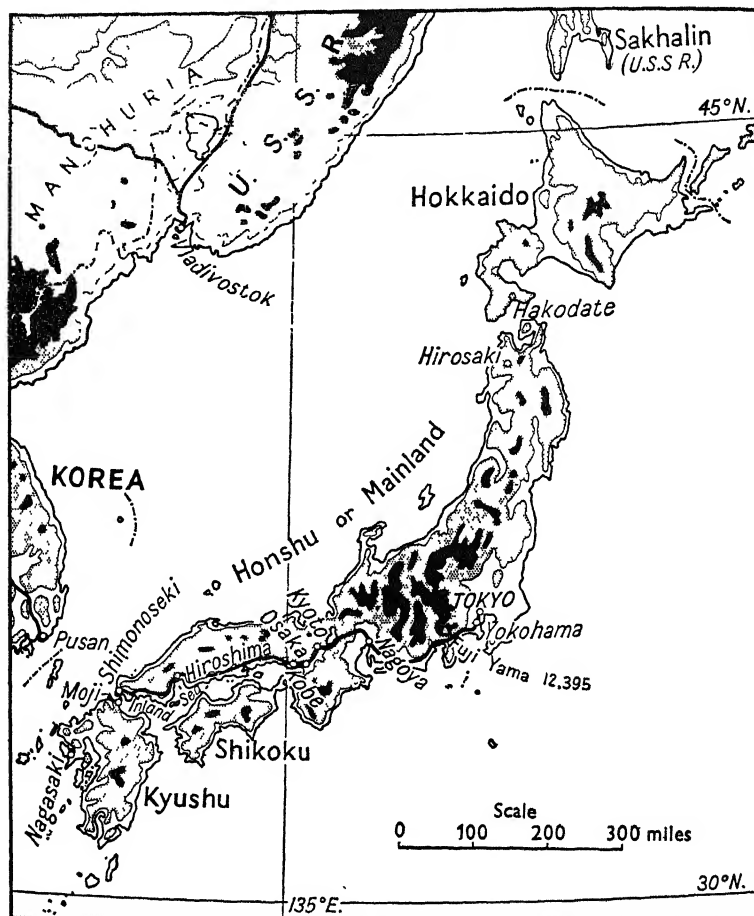


FIG. 259.—Japan. Land over 600 feet dotted; over 3,000 feet black.

Geology and Minerals. The geology of Japan is complex; associated with the sedimentary rocks are coalfields and anthracite fields, as well as some small oilfields, whilst metalliferous deposits are associated with the plutonic intrusions of the folded chains and with the volcanic areas.

Coal occurs in two main areas; in the island of Hokkaido in the north, of which Hakodate is the port; in the island of Kyushu

in the south, of which Nagasaki is the port. The output is about 44,000,000 tons annually—insufficient for home needs.

Petroleum is mined chiefly in a field near the west coast about 300 miles north of Tokyo. The output is insufficient for home needs.

Copper is mined in several areas, and Japan figures as one of the world's largest producers. As in other countries, the production has varied considerably; it has increased greatly since the war. Other mineral products include gold, silver, zinc, sulphur, lead, and tin.

Climate. In general, the climate—or more correctly the climates—of Japan is comparable with that of China, but modified locally by Japan's insular position. As in China, there are strong north-west winds in winter, and feebler south-east winds in summer.

In winter the Japanese archipelago is warmer than corresponding latitudes on the mainland, and the country is divided roughly into northern and southern halves by the January isotherm of 32°. Although the west coast is exposed to the full force of the cold winds from the Asiatic mainland it is warmer than the east coast. The explanation of this surprising fact is found in the ocean currents. An important branch of the warm Kuro Siwo hugs the west coast, but the other branch is separated from the east coast by a wall of cold water. Winter temperatures (January averages) range from 15° in the interior of Yezo to 45° in the south of Japan, where the winters are mild. Over most of Japan the winter is dry, though not so dry as in north China. In crossing the Japan Sea the north-west winds, however, pick up a considerable amount of moisture and give a heavy precipitation, mainly in the form of snow, as they rise to cross the mountains. Some localities on the west coast have thus a greater rainfall in winter than in summer.

In summer, the July temperatures decrease steadily from just below 80° in the south to 60° in the north of Yezo. The monsoon rainfall has two maxima, one in June and July, the other about September.

Japan is sometimes compared with the British Isles as regards climate, but in reality a comparison with the New England coast is more apt.

Japan may, therefore, be divided into about four broad climatic regions:

(a) *Southern Japan*, or the sub-tropical region, embraces the islands of Kyushu and Shikoku, and Honshu as far north as lat. 35°, that is, roughly, the portion of the main island south of the mountain divide. This region includes all the coast round the inland sea and the south coast nearly as far east as Tokyo. The winters are mild (January average about 40° or 45°) and dry, while the summers are hot (July average 75°–80°).

(b) *Eastern Japan* embraces Honshu east of the main divide and north of 35° and includes a small part of Southern Hokkaido. Winters are dry but cold, owing to the influence of the cold Okhotsk current. Over the northern half of the area the January temperature is below freezing, in the southern half between 32° and about 38° F.

(c) *Western Japan* embraces the whole of the west coast of Honshu and the southern portion of Hokkaido, and is characterized by its winter precipitation, cloudiness, and fog.

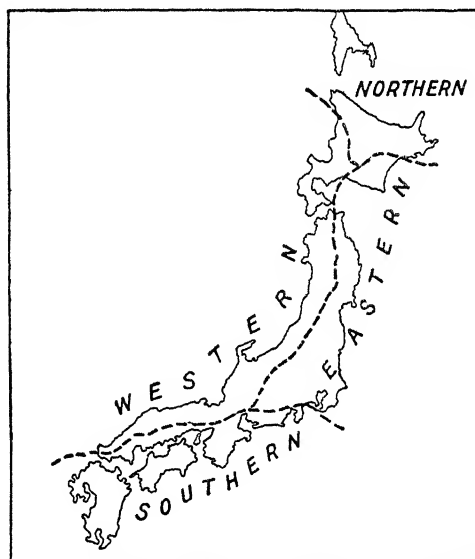


FIG. 260.—Japan: climatic regions.

(d) *Northern Japan*, or strictly Northern Hokkaido, together with Sakhalin, has bitterly cold, raw winters below 25° in January, and rather cool summers, July average 66° or 68° . The same type of climate may be said to exist in the mountain region in the heart of Honshu.

Natural Vegetation and Soils. The natural vegetation of Japan is forest. As a result of the mountainous nature of the surface over half of the whole country actually remains under forest. The forests of Japan are of three main types corresponding roughly with the climatic divisions just described.

(a) *Sub-tropical Forests* occupy the climatic region of Southern Japan and include broad-leaved evergreens such as the camphor tree and evergreen oaks, as well as deciduous oaks and several

species of pine. Rice is the chief cultivated grain of this southern region.

(b) *The Temperate Forests* occupy the climatic regions of Eastern and Western Japan, and are mixed coniferous and deciduous forests. There are various species of pine as well as oaks, chestnuts, and maples, and these forests are economically the most important in Japan. Large areas are found especially on the mountain slopes overlooking the Sea of Japan or the Pacific Ocean.

(c) *The Cold Temperate Forests* cover most of Hokkaido and Sakhalin and occur also above 4,000 or 5,000 feet on the mountains of Honshu. They are essentially coniferous forests. The soils are ash-coloured podsols.

Agriculture. Every available piece of land which can be used is used for agriculture in Japan, but even then there are only 19 million acres of cultivated land (including a small proportion of pasture) to support a population of 92,000,000. This may be compared with 24 million acres of cultivated land in England and Wales with 45,000,000 people. Thus, although intensive cultivation is assiduously practised, Japan is becoming more and more dependent on foreign supplies of foodstuffs. Therein lay the importance to Japan of the undeveloped lands of Manchuria. In order to economize valuable land villages are often built on steep hillsides and the hill is cut into tiny fields. Three-quarters of the arable land is cultivated by peasants. The principal food grain is rice, which can be grown all over the south because of the higher summer temperature, and which covers nearly 60 per cent. of the total arable land. Wheat, barley, and rye (rye in the cold north) together cover over half as much ground as rice. The other important crops are tea and tobacco. Japanese tea is different from that of India or Ceylon. A large proportion of the tea is exported to the United States, where it is more in vogue than in other parts of the world. Considerable numbers of cattle, nearly 4,000,000, are kept, but Japan is so carefully cultivated that there is little land left for sheep or goats. Large numbers of mulberry trees are grown for the sake of the silkworms, but the production of silk is less important than formerly. The silkworms are reared by the same farmer who grows wheat, an interesting example of mixed farming. Japan produces 75 per cent. of the silk of the world (not including China).

Fisheries. The continental shelf around Japan is one of the great fishing grounds of the world, and fish is an important article of Japanese diet. Nearly 1,500,000 people are engaged in the industry, and the total value of the fisheries is even greater than that of the British fisheries. Food fishes include herrings, sardine, anchovy, mackerel, and many others characteristic of Japanese

waters, such as the bonito. Japan has also a unique industry in the breeding of pearl oysters and of culture pearls. Grains of mother-of-pearl are introduced between the shells of three-year-old oysters, causing the oysters to secrete a pearl round the irritating object. In this way in four years a pearl of considerable size is formed, which is indistinguishable from a pearl naturally formed.

Manufactures. The principal industries are the manufacture of cotton, silk, and woollen goods, paper, earthenware and glass, and matches. Japan is noted for cheap cotton and silk goods, as well as cheap toys, matches, etc., but the quality is, broadly speaking,



FIG. 261.—The manufacturing belt of Japan (*after Trewartha*).

1. The Tokyo region.
2. The Nagoya region.
3. The Kobe-Osaka region.
4. The Northern Kyushu region.

All the industrial areas were severely bombed during the war, but by 1949-50 production had recovered to the level of 1932-36. Chemicals have come to occupy first place; textiles are only a quarter their former importance.

below that of other countries. In the inter-war years there was a marked development in the production of better quality textiles, and by 1933 Japan had become second only to the United States in the production of artificial silk and artificial silk goods. The industrial revolution in Japan occurred mainly after the China-Japan War of 1894-95. The growth of factories has been extremely rapid, especially during the World Wars, and now Japan is again working hard to expand her export trade. Competition is particularly keen in Eastern markets, such as India. Japan is now concentrating her attention on the improvement of the quality of her goods. Just like Great Britain, Japan has to import much of the

raw material for her industries—especially cotton (from U.S.A. and India), wool (from Australia), and iron.

In the development of manufactures Japan has made considerable use of hydro-electric power. This is not surprising seeing that the country is mountainous, has a good rainfall, and consequently numerous swift streams, and is at the same time deficient in coal. Something like 15,000,000 H.P. are developed, mainly from the rivers of the central part of the mainland, conveniently situated for supplying Tokyo and Yokohama in the eastern zone, Kyoto, Osaka, and Kobe in the western zone.

Japanese manufactures still include many of the native goods produced in small factories in the villages and towns. Examples are Japanese paper, lacquered ware, toys, knitted goods, and some silk. Modern-type factories tend to be concentrated in the larger towns, especially the six western-type towns or cities of Tokyo, Yokohama, Nagoya, Kobe, Osaka, and Kyoto. There leading places are taken by chemicals and metal goods, cotton and artificial silk piece goods, silk piece goods, European-type paper, pottery, porcelain, matches, and sugar refining.

The manufacturing belt of Japan extends from northern Kyushu and the western entrance to the Inland Sea, along both shores of that sea to Tokyo and the Kanto Plain on the east.

The four chief foci are shown in black on Fig. 261.

1. The Tokyo industrial region, remarkable for a great variety of small industries.

2. The Ise Bay or Nagoya industrial region, concerned with the reeling of silk, porcelain, and cotton manufactures.

3. The Kobe-Osaka region is particularly the textile region, but has also manufactures of small metal goods and machinery.

4. The Northern Kyushu region, being near the coalfields and conveniently situated for importing iron ore and pig iron from Manchuria, is associated with heavy industries.

The area marked 5 on Fig. 261 is that associated with silk weaving.

Population. The Japanese are the most progressive and probably the cleverest of all the Mongolian races. They have adopted and often improved all the great inventions of western nations. They became a first-class power, with the third largest navy in the world, and the men who were physically fit were trained either in the army or navy. One of the remarkable features of Japanese development has been the expansion in population from under 36,000,000 in 1879 to over 72,000,000 in 1938 and to 83,000,000 at the 1950 census despite 2,000,000 war casualties.

The indented character of the coast-line has had the same effect as in England. The Japanese are a seafaring people, and have a large merchant navy. The westernization of Japan has had the

effect of causing a curious contrast between the six great metropolises or large industrial cities, Tokyo, Osaka, Nagoya, Kobe, Kyoto, and Yokohama, quite like the manufacturing towns of Europe or America, and the quaint old country towns and villages.

Cities. *Tokyo*, the capital, is one of the world's greatest cities, with 9 million people. It was partly destroyed by the earthquake in 1923. It is a busy manufacturing centre.

Osaka (3,200,000) is the principal manufacturing city of Japan (the "Manchester" of Japan), and is also a port. *Kobe* is the second port of Japan. *Kobe* is close to *Osaka*, and the whole forms one great manufacturing district. *Kyoto* is the old capital of Japan, and a fine historic city. It has, however, moved with the times and developed numerous manufactures. *Yokohama* is the largest port of Japan; it is not only the port of Tokyo but has large manufactures of its own. It was entirely destroyed by the earthquake

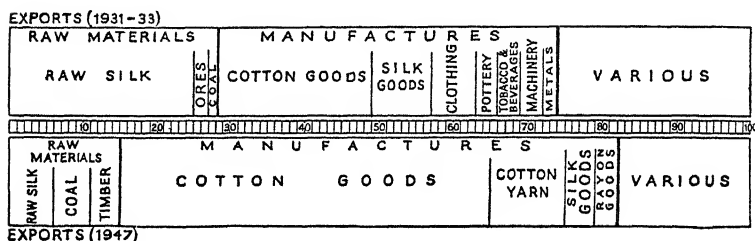


FIG. 262.—The exports of Japan.

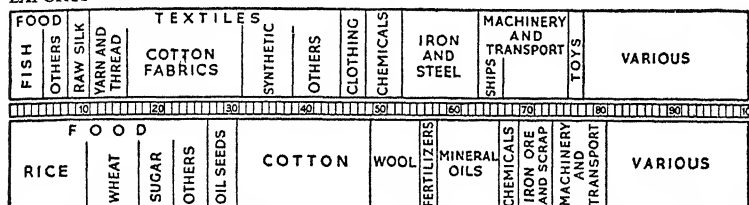
and fire of 1923, and most of the merchants moved to Kobe or Osaka. Later they returned and the city has now been completely rebuilt. *Nagoya* is another modern centre, but is an ancient city also. *Nagasaki* is a coal port and an important naval station, and the principal town on Kyushu. *Hiroshima* is a large port on the Inland Sea, whilst *Moji* and *Shimonoseki* are twin ports at the western entrance to the Inland Sea. They are to be connected by a railway tunnel under the straits. It is from here that boats go across to Korea. *Hakodate* is the principal town and port of Hokkaido.

Railways. Japan is well served by railways on the gauge of 3 ft. 6 in. now being changed to 4 ft. 8½ in. and electrified. One of the most important lines runs through the country and connects the principal towns—from Shimonoseki to Hiroshima, Kobe, Osaka, Kyoto, Nagoya, Yokohama, and Tokyo. The direction of many of the railways is controlled by the mountainous nature of the country.

Foreign Trade. Before the Second World War the Japanese Empire could be divided into two zones; a densely populated, industrialized inner zone, and an outer zone, the function of which was largely to supply food and raw materials to the inner zone.

Formosa, Chosen, Hokkaido, and Karafuto all belonged to the outer zone; Old Japan (Honshu, Shikoku, and Kyushu) formed the inner ring.

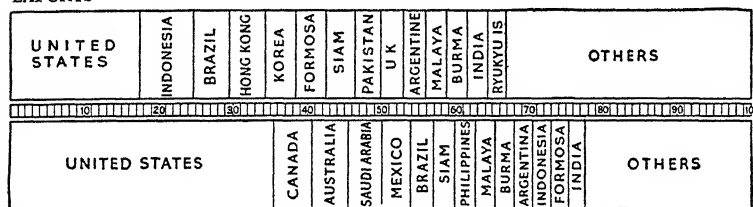
EXPORTS



IMPORTS

FIG. 263.—The foreign trade of Japan in 1954.

EXPORTS



IMPORTS

FIG. 264.—The direction of Japanese foreign trade in 1954.

KOREA

Korea is a large, mountainous peninsula. After the war between China and Japan in 1894 it became independent. In 1910 it was annexed to the Japanese Empire, partly in order that it might not be seized by Russia. After the defeat of Japan by the Allies in 1945, the 28,000,000 Koreans were promised independence. Korea is essentially an agricultural country and grows more rice, barley, peas, beans, and cotton than are needed for home consumption, and so was of the utmost importance to Japan. Korea also produced huge quantities of raw silk to feed Japanese industries. Korea is rich in minerals, including iron ore, which are so badly needed by Japan. The country is capable of further development, but tremendous strides have been made since 1919. The great need is improvement of communications. The principal town is *Seoul*; whilst the port of *Fusan* is only about 120 miles from Shimonoseki, in Japan. Over 90 per cent. of the exports went to Japan, which supplied three-quarters of the imports. The leading exports are rice, beans, fish, raw cotton, and iron.

Korea may be divided into the regions shown in Fig. 265.

1. *The Central and Northern Mountain Region* is a wild region, sparsely inhabited by rather backward natives who attempt a

little cultivation in the valleys. The rich forests have been largely removed.

2. *The Eastern Coastal Strip* is a narrow, isolated region inhabited mainly by fishermen who also cultivate rice and millet for their own use.

3. *The South-Eastern Silk Area* has made great progress in recent years, and enjoys good communications, especially to Fusan, its natural outlet.

4. *The South-Western Agricultural Basins* are by far the most important parts of the country. It is a two-crop region, with the rice harvest in October and the wheat or barley in June before the monsoon rains break. Sericulture is also important.

5. *The North-Western Agricultural Basins* have a severer winter and there is only one harvest. Rice gives place largely to wheat, millet, and soy beans. This is also the mining region of Korea.

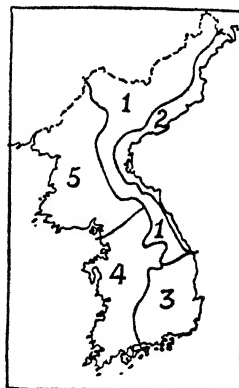


FIG 265.—The natural regions of Korea.

Korea north of the 38th parallel was the zone of Russian occupation in 1945, American troops occupying the area south of that line. Occupying troops were later withdrawn but the North Koreans invaded South Korea in 1950 and war broke out. The United Nations, with American troops in the majority, supported South Korea; Chinese Communists assisted North Korea.

TURKEY

The present-day republic of Turkey occupies a compact, roughly rectangular block of country, the whole of Asia Minor, in Asia and about 9,000 square miles of European territory between Istanbul (Constantinople) and the Maritza River. The whole area is about 295,000 square miles, and the population 26,000,000, of whom 24,000,000 are in the Asiatic portion. Modern Turkey is entirely different in character from the old Turkish Empire. The Empire included large numbers of Greeks, Syrians, Arabs, and other races differing in language, customs, and creed. The Sultan was not only supreme ruler of the Empire, but was also head of the Mohammedan religion. The modern Turkish republic, on the other hand, is essentially Turkish; the Greeks and other nationalities have been expelled and the country divorced from the Mohammedan religion; the Turks aim at building up a national state on modern European lines. Within a few years they have adopted European dress and

the European alphabet (Roman) and abolished many of their oriental customs.

The whole of Asiatic Turkey, that is, Asia Minor, consists of a plateau and its marginal lands. Bounded on the north by the Black Sea, on the north-west by the Sea of Marmara, on the west by the Ægean, on the south by the Mediterranean and the Mesopotamian lowlands, the boundaries are well defined except on the east, where they pass through the tangled mass of mountains known as the Armenian Knot. The surface of the plateau has an average elevation of about 2,500 feet; it has a slight tendency to slope towards the centre, where lies the large but shallow lake of Tüz Göl, and rises generally eastwards towards the Armenian Knot. On the north the plateau is bounded by the Pontic mountains, consisting of a succession of ranges with a general east to west trend separated by deep valleys. From the plateau towards the Black Sea one first climbs the innermost range and then descends by a series of deeply hollowed steps. The rivers of this region often have long courses parallel to the coast before breaking through one of the ranges. These ranges are often short, and none runs the whole length of the plateau. On the south, the plateau is bounded by the Taurus, again consisting of a succession of short ranges, but less complex than the Pontic and sometimes dropping sheer to the Mediterranean.

The Plateau is dry and largely covered with poor grass. An important occupation of the nomadic inhabitants is keeping herds of goats and sheep, especially the famous Angora goat. In the heart of the plateau lies *Ankara*, now the capital of Turkey.

The Coastlands border the Mediterranean Sea and the Ægean Sea. The soil is often fertile and the climate is Mediterranean, so that fruits such as the grape, olive, and fig are grown. Wheat, barley, tobacco, and cotton are also produced. The principal port of Asia Minor is *Izmir*, formerly *Smyrna*, which commands easy valley routes on to the plateau.

Foreign Trade. The exports of Turkey have been increasing in value since the end of the Second World War, the leading items being cotton, tobacco, fruit, and wool, including under the last the woollen carpets which one associates especially with the country. Amongst the imports iron and steel goods, machinery, motor vehicles, mineral oil, cotton goods and metals take leading places.

CYPRUS

The island of Cyprus was conceded by the Turks to Britain as long ago as 1878, but it has remained a comparatively little-known portion of the British Commonwealth. It has an area of 3,584 square miles and a population of about half a million consisting mainly of Greek and Turkish descendants. The island

can be divided into three physical units: the northern range of hills, the central stretch of plains, and the southern mass of mountains. The winter is cold, the summer scorchingly hot; the rainfall on the whole is low. Economically the most important part is the central plain which, owing to its sheltered position, is a very arid tract except where irrigated. In spring the whole of Cyprus is delightful, and the harvest of barley and wheat is early, whilst a rich profusion of fruits is produced later in the year. There is

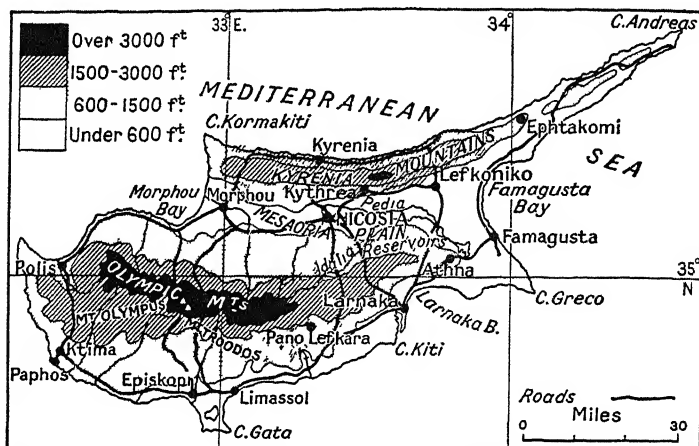


FIG. 266.—Cyprus.

no doubt that Cyprus is capable of much greater development, though recently there have been great changes. In 1959 it was agreed that Cyprus should become an independent republic. It has considerable mineral wealth and minerals provide over half the exports by value. The principal towns are shown in the accompanying map—Nicosia is the capital.

IRAN (PERSIA)

Iran is a large country, but has only about fourteen people to the square mile, since a very great part is covered by deserts and high mountain ranges.

The Northern Lowland Strip lies along the shores of the Caspian Sea; the rainfall is heavier than in other parts of Persia, and the soil is good. Rice, sugar, and cotton can be grown, but the strip along the coast itself is feverish. The slopes of the hills are forested, and the towns are built at the foot of the slopes. Above the forest, pasture land is found.

The Central Plateau and Mountains occupy most of the country. Surrounded by a ring of mountains is a great salt desert, and any rain drains into an inland lake. The winters are cold and the summers are hot; the little rain which does fall comes in the winter, so that Persia really has a very dry type of Mediterranean climate. Most of the inhabitants live in oases in the desert where grain, cotton, tobacco, and opium can be grown, or in the more fertile valleys amongst the mountains. The mountains are inhabited by nomadic pastoralists. The most fertile valleys, where grain can be grown, are in the north-west, where the capital, *Teheran*, is situated.

The Gulf Coast bordering part of the plain at the head of the Persian Gulf, as well as the eastern shores of that Gulf and the Gulf of Oman, is a dry dusty region. It has become important owing to the development of oilfields inland. The towns along this coast, *Bushire* and *Bandar Abbas*, serve as ports for the interior.

AFGHANISTAN

Most of Afghanistan is over 4,000 feet high, and many of the mountain ranges rise to 15,000 feet and more. The climate is continental, many areas are snow-covered for several months of the year, but the summers are hot and dry. The Afghan people are mainly nomads, and their wealth lies in their flocks of sheep, goats, etc. Agriculture, where practicable, is carried on by the help of irrigation.

ARAB ASIA

Introductory. Over nearly the whole of South-Western Asia south of the mountain belt of Persia and Turkey, the Arab race and the Arabic language are predominant, and hence the convenience of the name "Arab Asia" to include the whole of this tract. It is now divided between the republics of Syria, Lebanon, and Israel (Jewish), the Hashemite Kingdom of Jordan, Republic of Iraq, Saudi-Arabia kingdom of Arabia proper, and British spheres of influence extending from Aden and along the Persian Gulf.

Physical Features. Well defined on the north by a mountainous rim, Arab Asia is demarcated on all other sides by the sea, except along the narrow isthmus of Suez which separates it from Africa. The dominant feature of the whole area is the great plateau of Arabia, with its high south-western edge overlooking the Red Sea and its long, gentle slope north-eastwards to the plains of Mesopotamia. In the east the plateau merges into the fold-mountain country of Oman, the ranges of which are connected with the Persian system on the other side of the Persian Gulf. In the west along the Mediterranean Sea are the north to south mountain and valley systems of Syria and Palestine, including that famous trench, the Jordan Rift Valley. Geologically the whole area, with the exception

of the fold ranges of Oman, consists of an ancient block of metamorphic rocks, and is thus comparable with the plateau of peninsular India. The ancient rocks, however, are hidden over large areas by later deposits, by great spreads of almost horizontal limestones in Palestine and Syria and by vast tracts of alluvium in Mesopotamia (compare the alluvium of the Ganges Plain). Along the high south-western edge of the plateau, and, indeed, over many other parts of the plateau, there are huge spreads of lava, much of which is of comparatively recent age.

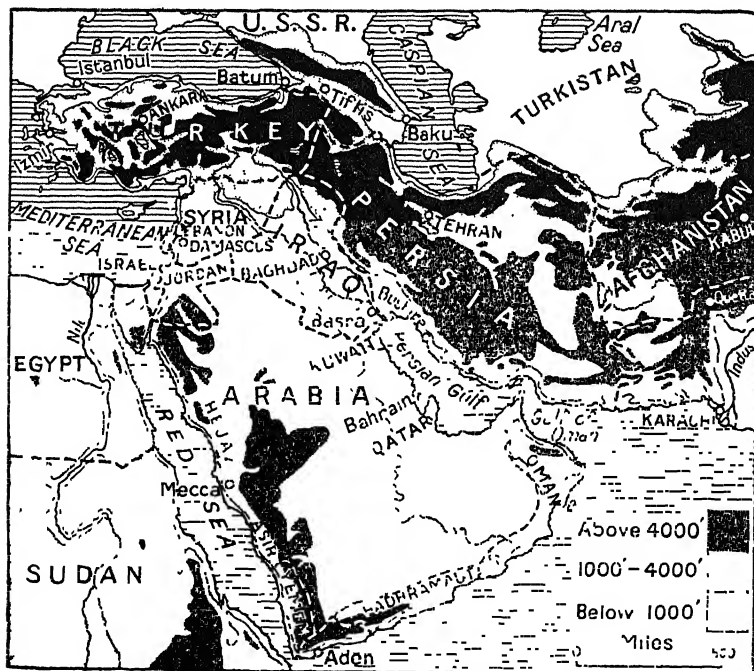


FIG. 267.—South-Western Asia.

Climate. The Tropic of Cancer passes through the heart of Arabia and across the centre of the Red Sea, so that Arabia is essentially in the Extra-Tropical High Pressure Belt of the Sahara. In the extreme south the mountains are slightly influenced by the monsoons of the Indian Ocean; on the other hand, the parallel of 34° N., which passes through the centre of the eastern Mediterranean, passes slightly to the north of Beirut, Damascus, and Baghdad, so that this tract (*i.e.* Syria and northern Mesopotamia) lies in the continuation of the Mediterranean belt. The cyclones which bring the rainfall to Mediterranean lands give Syria and Palestine a

characteristic winter rainfall and then work their way, with decreasing intensity it is true, along the lowlands of Syria south of the great belt of mountains, and so into the Mesopotamian plains. The rainfall from these cyclones gives rise to the famous "fertile crescent" connecting northern Syria and Mesopotamia. Reference will be made later to the great importance of this particular tract.

Vegetation. The natural vegetation of most of South-Western Asia is the Evergreen Mediterranean Woodland, passing gradually into scrub and desert as the rainfall decreases. Arabia is often popularly regarded as if it were one vast desert. Actually it consists of what may be called, for want of a better name, dry steppelands (though they are not necessarily dry grasslands), surrounded by a ring of true desert country. Amongst the arid steppelands are numerous large and important oases capable of supporting a large settled population.

Population. The Arabs are the natives of Arabia and were organized in small tribes ruled by a chief sheik. They fall readily into two classes, settled tribes and the nomadic tribes who are otherwise known as Bedouins. On the borders of the tract under consideration, that is to say in Palestine, Syria, and Mesopotamia, the Arabs have come very markedly under the influence of surrounding nations. The main lines of communication in the past between Europe or Africa and Central and Eastern Asia have passed through South-Western Asia, so that the population bears the impression of contact with such varied nations as the Egyptians, Greeks, Romans, Turks, French, and British. The settled population of these borders, therefore, though largely of Arab stock, is more conveniently called Syrian. The Jews of Palestine will be considered later.

Communications. If we exclude the northern routes through Russia, the possible lines of communication between Europe or Egypt and India or the Far East which were available to the ancients are not numerous. The passage through the complex of mountains of Armenia was extremely difficult, leaving two groups of routes:

(a) *The Red Sea Routes.* The ancients utilized these routes by going up the Nile Valley to Thebes, crossing the desert to a port on the Red Sea, and thence by sea to India. The present-day route has been developed into the Suez Canal route which, it will be noticed, is controlled by the nation which commands Suez on the one hand (Egypt) and the nation commanding the entrance to the Red Sea on the other. Here Great Britain holds Perim Island in the Straits of Bab-el-Mandeb (and also the Aden coast), France the opposite coast of Africa (French Somaliland).

(b) *The Persian Gulf Routes.* Because of the mountains on the north and the desert on the south these routes from the Mediterranean to the Persian Gulf had of necessity to pass along

that fertile tract to which we have already referred, known as the Syrian saddle or the fertile crescent. In the years before 1914 the bold bid of Germany to gain control of this ancient route by building the Baghdad railway emphasizes the controlling influence which geography may still exercise. The actual Baghdad railway, it should be noticed, starts from Konia on the Anatolian plateau, and threads its way by a series of tunnels through the Taurus range near the famous pass known as the Cilician Gates, to the Syrian town of Aleppo. From Aleppo it reached as far as Nisibin, about 150 miles from the Mesopotamian railhead. Iraq finally completed this intervening section in 1940. Now air routes are very important.

ISRAEL AND THE HASHEMITE KINGDOM OF JORDAN

At the end of the First World War, the ancient land of Palestine, the Holy Land, was freed by British armies from the domination of the Moslem Turks. At the request of the old League of Nations, Britain agreed to rule the country under their mandate. The boundaries of Palestine were so drawn as to cover 10,000 square miles and include all the new Jewish settlements as a declaration had been made that Palestine should become the national home for Jews. Actually Moslem Arabs (or Syrians) formed a majority of the people and trouble was inevitable as Jewish immigrants swarmed in. Eventually Britain gave up the mandate in 1948 and the Jews established the state of Israel over the predominantly Jewish areas whilst the King of Transjordan, from across the Jordan, expanded his Kingdom to include the Arab parts of Palestine, renaming his domain the Hashemite Kingdom of Jordan.

Physical Features and Climate. Palestine consists of three parallel strips:

(i) *The Coastal Plain* which lies along the Mediterranean and is broad in the south but narrows northwards where Mount Carmel almost reaches the coast. The climate is typically Mediterranean with a comparatively small range of temperature, frost and snow being unknown in winter and the average August temperatures not exceeding about 80°. The rainfall increases steadily from south to north. Climatically favoured, the maritime plain has also a light, fertile soil, and the whole area is proverbially fertile. Much, however, is uncultivated at present, and there are large areas available for Jewish settlement. Around Jaffa are the famous orange groves; farther north are cornfields and vegetable gardens. Bananas also grow well in this region.

(ii) *The Hill Country*, also called West Jordan Land, forms a strip lying between the coastal plain on the west and the Jordan Rift Valley on the east, and about 25 to 40 miles in width. It is

divided into two separate blocks by the broad, fertile plain of Esdraelon, the block to the north known as Galilee, the high block to the south including Samaria and Judæa. The whole country is built up of a succession of hard impervious limestones

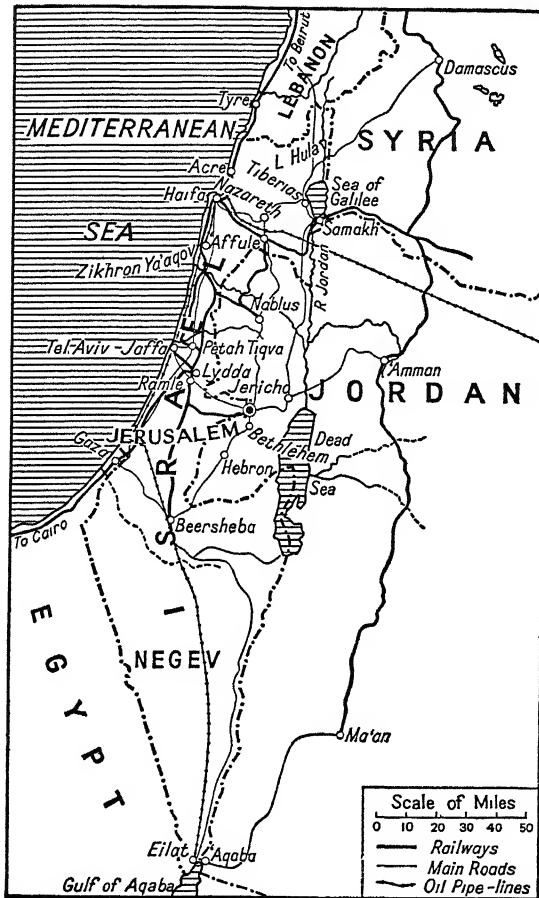


FIG. 268.—General map of Israel.

Notice outlet to the Red Sea in the south and the large southern tract, very arid but capable of development. There are now good roads south to Eilat and to the southern end of the Dead Sea. Much irrigation, settlement and development has taken place around Beer-sheba, now also served by railway.

and softer chalky limestones, the beds being approximately horizontal. Where the hard limestone prevails the hills are barren and stony, the innumerable valleys narrow and dry, whereas the chalky limestones give rise to more fertile country; the very best country, however, is that in the north, where the rainfall is

heavier and where lava flows have disintegrated to a rich soil. The climate is more severe than that of the coastal strip, January average temperatures being as low as 45° , frost being usual and snow not uncommon. The natural vegetation is rough scrub, whilst amongst cultivated plants olive groves are especially important in Samaria and corn crops in Galilee, but very large areas are uncultivated and tenanted only by a few sheep or goats. This is especially the case in the south, where the rainfall is very low. Jerusalem lies in the heart of the whole belt of Judæa about 3,000 feet above sea-level, whilst Nazareth occupies an almost corresponding position in Galilee.

(iii) *The Jordan Rift Valley* is a long, straight valley with very steep, almost precipitous sides and averaging 10 to 15 miles in width. It is drained by the Jordan, which rises in the north, flows through the Sea of Galilee, and then for 70 miles pursues its course before emptying into the Dead Sea, the surface of which is 1,292 feet below sea-level. As on the coastal belt, temperatures are much higher but are here more extreme; Jericho, for example, ranges from 54° in January to 89° in August. Frost and snow are entirely unknown. Much of the Jordan Valley is sheltered from rain-bearing winds and forms a very dry, almost desert tract. Considerable areas can be (and probably will be in the near future) irrigated from the Jordan, though in the south the soil is too impregnated with salt. Where the rain-bearing winds from the Mediterranean can penetrate, as they do south of and around the Sea of Galilee, the tract is a fertile agricultural one. The crops possible are those mentioned in connection with the coastal plain, and therefore contrast with those of the hill belt, where such warmth-loving plants as bananas will not grow.

Population. The population of Palestine consisted in 1918 of two-thirds Syrian Moslems, one-twelfth Christians, mainly Syrians, and one-quarter Jews. The almost insoluble problems of the country are bound up with the racial and religious differences of this population. Palestine is the promised land and the ancestral home of the Jews. It is also the birthplace of Christianity and contains the spots most sacred to Christians; but Jerusalem, after Mecca, is the holiest of Mohammedan cities, and was in Moslem hands continuously for seven centuries until 1917. Fortunately, the country was far from overpopulated, and it is estimated that one-third of the whole area was available for settlement. Immigrants came mainly from the countries of eastern Europe. By 1960 there were 2 million Jews in Israel. The Jewish cultivators were very active and have in particular drained and rendered fertile the once malarial and unhealthy stretch of the Plain of Esdraelon. In addition the large modern town of Tel-Aviv adjoining Jaffa is a monu-

ment to Jewish enterprise; a thriving city with numerous and varied manufactures now stands where a few years ago was a waste of sand-dunes. Continued immigration however is a great problem.

Trade. The exports of Palestine before the outbreak of war in 1939 were worth about £4,000,000. By far the most important exports are oranges; other items include soap made from olive oil, water-melons, wine, and almonds. Many manufactures have been developed, especially those requiring small quantities of raw material. Polished diamonds and false teeth, for example, are made and exported. Imports include numerous foodstuffs, despite the fact that Palestine is predominantly agricultural and can grow larger quantities of wheat and barley and millets than it at present produces. Palestine is poor in minerals, but the Dead Sea salts are now being utilized and there are new hydro-electric power works on the Jordan. In 1953-59 exports of Israel were worth only one fifth of the value of the imports.

REPUBLICS OF SYRIA AND LEBANON

Position and Area. The country known as Syria was under French mandate until 1936, when two independent republics were formed. The Republic of Lebanon, finally demarcated in 1944, is the coastal state, with the towns of Tripoli, Beirut, Sidon, and Tyre. It covers 4,000 square miles compared with Syria's 70,000. Syria's own port is Latakia; chief towns Aleppo and Damascus. In 1958 Syria joined Egypt as the United Arab Republic.

ARABIA

Arabia proper is a great peninsula with an average breadth of 700 miles and a length of 1,200 miles, having thus a total area of about a million square miles, or considerably greater than that of the Indian Peninsula. It is interesting to note that the Arabs refer to their home as the "Isle of the Arabs," thus emphasizing the geographical isolation of the peninsula, bounded by the sea on three sides and the desert on the fourth.

The surface of Arabia may be divided into (1) true deserts, (2) dry steppes or steppe deserts, and (3) oases of cultivated land. The true deserts where vegetation is absent may be formed of hard gravel plain, continuous tracts of sand, by belts of soft sand-dunes (rare), or by harrah, the name given to tracts of rough lava, the surface of which cuts the feet of men and animals to pieces. The huge area in the south, the name of which means "the abode of emptiness," should be especially noted. The dry steppes are vast tracts with a hard or dusty surface, with occasional natural water-holes and permanent though coarse vegetation in the hollows which supplies sufficient fodder for the camels and horses of the nomadic tribes. The oases of Arabia occur in two tracts, (a) in the

heart of Arabia surrounded by a ring of deserts, and (b) along the coasts or margins. The most important of these tracts in the centre is known as Nejd, and there are at least sixty or seventy settlements of considerable size and which probably support a total population of between 500,000 and 1,000,000. Of the outer ring of fertile tracts the most important is that in the south-east, the Yemen, famed as the home of the celebrated Mocha coffee. The excellence of this coffee grown on the hill slopes is said to be largely due to the rising mists which protect the trees from the heat of the day. The population of this area is probably about four million and a half. Farther north are other small tracts; that of Ta'if is important because it supplies much of the food required by the sacred city of Mecca. It is estimated that between 100,000 and 500,000 pilgrims travel to Mecca

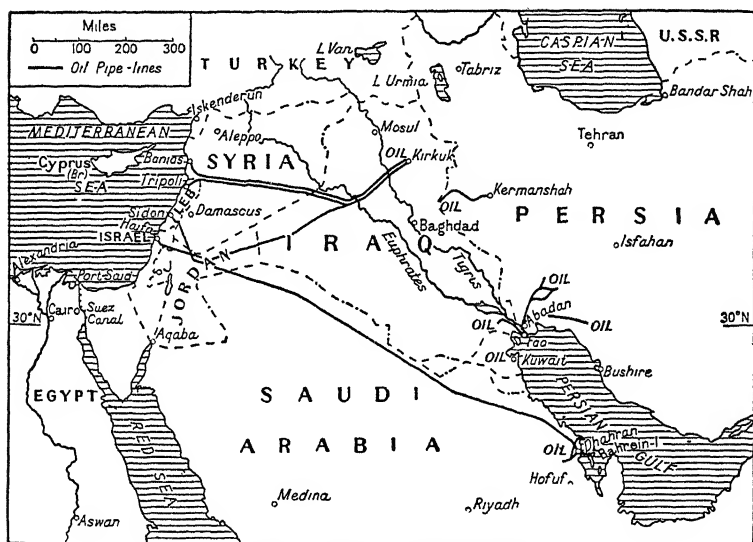


FIG. 269.—Oil in the Middle East.

every year, reaching the sacred city in one of four ways—from Damascus by railway to Maan and thence to Medina and Mecca; from Cairo across Sinai; from Baghdad through the heart of the peninsula *via* the oases; or, most important of all, by the port of Jiddah (Jedda).

Since 1932 the Kingdom of Saudi Arabia has extended over 927,000 square miles and includes Hejaz, Nejd, and Hasa. Yemen is an independent kingdom whilst the small but now important oil-bearing sultanates or sheikdoms of Kuwait, Bahrain, and Qatar on the Persian Gulf coast as well as the Sultanate of Muscat and Oman are under British influence.

Oil was found in Bahrain in 1932 and in 1935 on the neighbouring

mainland in Saudi Arabia and Kuwait, and since then development has been spectacular. This may be the richest oil-bearing area in the world.

Aden is a volcanic peninsula on the south coast of Arabia, about 100 miles east of the entrance to the Red Sea, formerly under India but created a separate colony on April 1, 1937. It is a fortified coaling and oiling station (big new refinery, 1954) on the British route to India. A large adjoining area is under British protection.

IRAQ

Position and Size. Iraq was freed from the dominance of Turkey during the First World War and became an independent Arab state protected at first by Great Britain. Iraq includes the land between the rivers Tigris and Euphrates, to which the name Mesopotamia should properly be restricted, a considerable tract of country between the Tigris and the mountainous Persian border, and a large area of desert south and west of the Euphrates. The whole has an area of about 171,000 square miles, roughly twice that of Great Britain, and a population of about 5,000,000.

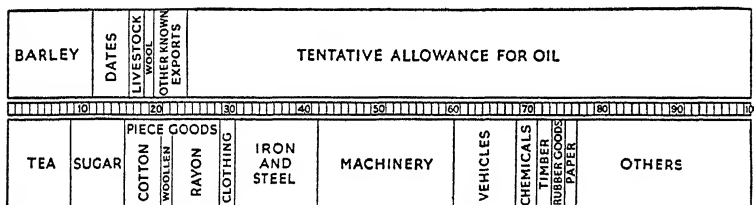


FIG. 270.—Foreign trade of Iraq in 1954.

Upper Iraq corresponds roughly with the Assyria of old and embraces a large portion of Mesopotamia, that is, the land between the rivers, as well as the country between the Tigris and the foothills of Kurdistan. It consists chiefly of open, undulating, treeless plainland, sometimes with low hills and for the most part arid and with a saline or alkaline soil. Cultivation is largely limited to the deep, broad river valleys where wheat and barley are the chief crops, both of excellent quality, and large quantities of tobacco are grown.

Lower Iraq stretches from a little above Baghdad to the Persian Gulf. The whole area is level, sloping very gradually to the sea: the soil is a fertile alluvium, still being added to by the overflow of the two rivers. In the days of the Babylonian Empire this appears to have been a land of amazing fertility with the flood waters of the rivers carefully controlled by inundation canals. Now much of the land lies waste, there are huge swamps which form breeding grounds for malarial mosquitoes, and the tract as a whole

awaits a comprehensive scheme of irrigation and development. Rice is the great crop along the river valleys, but very special importance attaches to the cultivation of dates, and Iraq has been estimated to produce four-fifths of the world's dates. The dates themselves are the staple food of the Arabs, utilized in a great variety of ways: syrup and vinegar are made from old dates, as well as a strong spirit, the terminal bud of the date palm is eaten as a vegetable, the leaves of the palm are used for matting and thatching houses, the fibre of the outer trunk for rope, and the timber for building. Another crop of Lower Iraq which might be more extended is cotton, since the climate, closely resembling that of Egypt, which is characterized by great extremes, is suitable for the cultivation of the finer types of Egyptian cotton.

The Desert Fringe is unimportant, being inhabited mainly by semi-nomadic Arabs who rear camels, horses, and other animals.

Great strides in economic development have resulted in recent years from the discovery of oil.

EXAMINATION QUESTIONS

1. Write a concise geographical account of *either* Ceylon *or* Tasmania.
2. Divide the Yangtze Basin into natural regions, with a short account of each region.
3. Give a reasoned account of the distribution of rainfall in India, both as regards time of fall and total precipitation in the different regions.
4. Give a brief account of the foreign trade of India.
5. Point out what, in your estimation, geographical factors have contributed to the tardy economic development of China. Do you consider that Japan is or is not better endowed in this respect?
6. Relate the distribution of population to agricultural development in India.
7. Compare the relative merits of Calcutta and Delhi as capitals of India.
8. Write a geographical account of the position and development of Singapore, Hankow, Tientsin, Yokohama.
9. Compare the principal rivers of China as avenues of intercourse between the ports and the inland districts.
10. Give an account of the Baghdad Railway from topographical, economic, and political standpoints.
11. Examine critically the view that China is overcrowded.
12. Estimate the economic prospects and possibilities of Chinese settlement in Manchuria.
13. Give an explanatory account of the distribution of population in India with special reference to areas of high density.
14. Draw a sketch-map showing the division of *either* India *or* Australia into its principal vegetational regions; and give a reasoned account of *one* of these regions.
15. Draw a sketch-map showing the principal structural divisions of *either* India *or* Australia. Give an account of the physical geography of *one* of the major structural divisions you indicate.
16. Give a reasoned account of the economic geography of Mesopotamia, with reference to probable and possible developments.
17. Examine the possibilities of developing a large-scale iron and steel industry in India.
18. Analyse with reference to geographical conditions the external trade of India.
19. Suggest a division of Japan into geographical regions, and give a short account of each region.

20. Take any *two* of the areas—the Deccan, Manchuria and Mongolia Basin—and show how they differ geographically from each other.

21. Give an account of the production of cotton and the cotton manufacturing industry in India *or* China *or* Japan.

22. Describe briefly the distribution of mineral resources and the exploitation of these resources in India *or* China *or* Japan.

23. Give an account of the geographical factors which have led to the remarkable density of population found in monsoon lands (India, China, and Japan).

CHAPTER VI

EUROPE

Position and Size. With an area of only about 3,750,000 square miles, Europe is the smallest of the continents excepting Australia. It is characterized by the comparatively great length of the coastline,



FIG. 271.—The position and size of Europe.

broken up everywhere by peninsulas, gulfs, bays, and fringed by islands, with the result that only the heart of Russia is more than 500 miles from the sea. Europe lies almost entirely in middle latitudes—the North Temperate Zone; only a small fragment in the north is within the Arctic Circle ($66\frac{1}{2}^{\circ}$ N.). It is useful to note the position

of latitude 40° N.: cutting Spain and Portugal nearly in half, cutting off the "toe" of Italy, passing through Greece, and running south of the Black Sea, but across the south of the Caspian. The British Isles lie roughly between latitudes 50° and 60° . The central meridian in Europe is 20° E. (the same one as in Africa); the all-important meridian of 0° passes, of course, through London; through the heart of Russia runs 40° E.

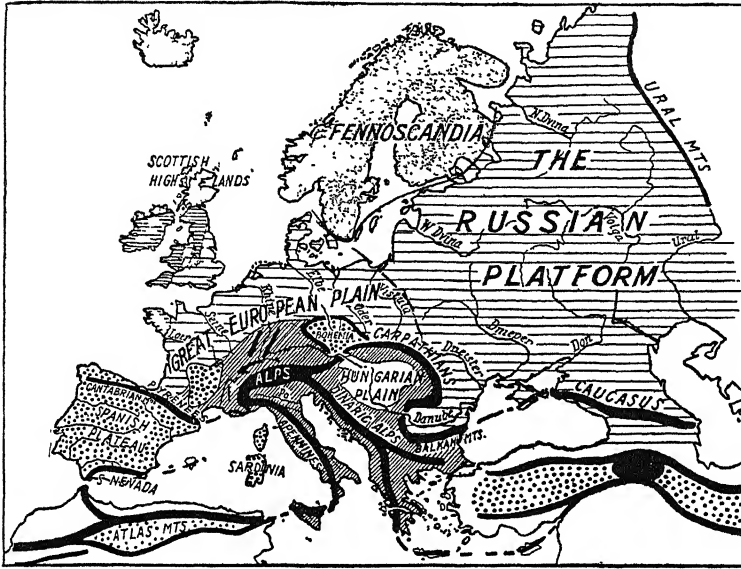


FIG. 272.—The main physical and structural features of Europe.

Structure and Physiography. Europe may be divided broadly into four groups of units on the basis of structure and relief:

- (a) The ancient earth-blocks of the north.
- (b) The Russian Platform.
- (c) The Great European Plain.
- (d) The young fold mountains of the south, formed of many mountain loops, enclosing small plains and plateaus.

The Ancient Earth-blocks of the North. There are now in the north of Europe four masses, each consisting of ancient metamorphic rocks. Probably the four masses were once joined up, forming a single continental mass. This was formed in the early days of the earth's history by the earth movements known as the Caledonian which occurred at the end of the Silurian period. These earth movements resulted in the formation of a great series of mountain

chains which had a general trend from north-east to south-west. For long ages the land mass so formed remained above sea-level, but was gradually worn down by the agents of subærial denudation, till much of the tract became of low, or at least mature, relief. During the Tertiary era, when the great Alpine earth movements caused the rise of the Alps and Apennines, the Pyrenees and Carpathians, the old hard blocks in the north seem to have been strained or cracked. In some places volumes of basaltic lava broke through and flooded the surface; in other cases sometimes sets of cracks at right angles to one another developed, and parts of the blocks were upraised, others

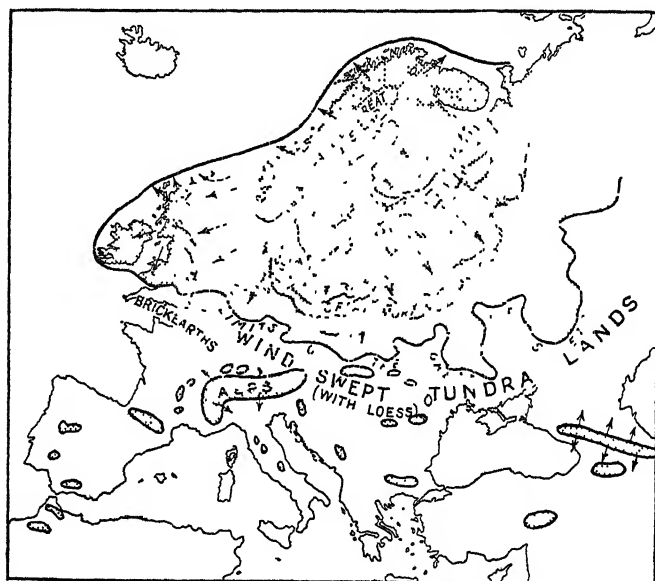


FIG. 273.—Map of Europe showing the maximum extent of the ice sheets of the Great Ice Age.

sank. Then came the Great Ice Age. The higher portions of the blocks became centres of ice caps; as the volume of ice increased and moved outwards from the centre of accumulation it profoundly affected the surface of the land over which it moved. It smoothed the jagged outlines, scooped out gigantic hollows (especially along the lines of weakness afforded by the cracks already mentioned) swept large areas entirely bare of soil. When the ice finally retreated, it left behind areas of ancient rock with a typically glaciated relief—smoothed outlines, lake-filled hollows, huge tracts of almost soil-less country, and accumulations of boulders or sand or clay elsewhere. Such is essentially the character of the three chief areas:

- (a) Fennoscandia, comprising Norway, the greater part of Sweden, and Finland.
- (b) The Highlands of Scotland.
- (c) The highlands of north-western Ireland.

The fourth area, Iceland, is marked by the great outpourings of lava of Tertiary and later date, and similar patches of lava occur along the west coast of Scotland and in north-eastern Ireland. Perhaps the most characteristic area of glaciated plateau is that "land of ten thousand lakes," the heart of Finland; whilst the most striking results of glacial and subærial excavation along lines of weakness are afforded by the fiords of Norway and of western Scotland.

The ancient rocks are, of course, devoid of coal and oil, but metalliferous deposits are frequently important. The great masses of fine quality iron ore of northern Sweden may be specially mentioned.

The Russian Platform. An area of ancient metamorphic rocks, somewhat similar to the Fennoscandian block, underlies practically the whole of the Soviet Union in Europe, but there the ancient rocks for a time sank below sea-level, and later again rose. They were thus hidden long before the Ice Age by wide stretches of sediment. The hard, old block beneath, however, prevented these sediments from being crumpled or folded by the Tertiary movements; the Ice Age merely succeeded in giving most of Russia a further coat of sedimentary deposits—this time of glacial origin and representing in the main loose material which had been swept off the surface of the Fennoscandian block. Hence the Russian platform is a great block of ancient rocks, almost completely covered with little-disturbed sediments which are in turn masked by superficial deposits of glacial origin.

The Great European Plain. Lying to the south of the ancient blocks of the north and north of the young fold mountains of the Alpine system, is the Great European Plain. Much of it is less than 500 feet above sea-level, and nearly the whole of it is under 2,000 feet. It must not, however, be looked upon as a flat plain, such as the Amazon lowlands, or even as a gently undulating area such as the prairie regions of America, being broken up by a multitude of small hills and even by mountain ranges. This varied character of the surface is a reflection of the complex geological history and structure. From the structural point of view we may distinguish broadly three groups of units:

(a) The "islands" of ancient rocks consist mainly of hardened sediments. From their character they tend to be resistant to weathering and stand up as hill masses, whilst the rocks usually yield but a poor soil. As examples may be quoted the Southern

Uplands, the Lake District, the Pennines, Wales, and the South-Western Peninsula in Britain; Brittany in France; the Ardennes in Belgium; the Rhine Gorge Massifs and the Harz Mountains in Germany. These hill masses are for the most part remnants of the mountains erected by the Armorican or Hercynian earth movements at the end of Carboniferous times. The resistant character of the rocks is often accentuated by the presence of masses of granite (as in Cornwall and south-eastern Ireland), or old volcanic rocks (as in North Wales and the Lake District). The poverty of the soil usually prevents such areas from being important agriculturally, and they tend to be covered with moorland or rough pasture, or to be forested. Many of the important metalliferous deposits of Europe are associated with these islands of old rock, *e.g.* the tin of Cornwall and the copper of the Harz.

(b) The intervening stretches of younger sedimentary rocks tend to form country of lower relief, of richer soils, and of greater importance economically. The rocks are usually but slightly folded, but the folding has been sufficient to give rise to lines of hills, where the more resistant members of the succession (such as the limestones, including chalk) are found, and to broad valleys where the softer members, such as clays, are found. South-eastern England (the Scarplands) is typical of the type of relief developed.

The coalfields of Europe tend to occur on the flanks of the older masses, but are frequently worked, in whole or part, through an overlying cover of younger rocks (*e.g.* the coalfields on the flanks of the Pennines). Many of the important iron ore deposits, such as those of the Midlands of England and those of Lorraine, are sedimentary rocks belonging to this group.

(c) Enormous areas of both the ancient islands and young sediments are hidden by a mantle of glacial deposits. We have already referred to the formation of ice caps over northern Europe and the southward spread of the ice. The rock *débris* swept from these northern areas was carried or pushed by the ice southwards. Then came the waning of the Ice Age, the melting and the retreat of the ice. The *débris* was left behind as a thick coat over the surface of the land. The retreat of the ice was not a steady movement, but took place rather by a series of jerks. The halts are marked by characteristic ridges or terminal moraines extending, often for hundreds of miles, across the country. At the same time the innumerable streams of water which arose from the melting ice redistributed the finer material, or sorted the mixed *débris* into gravels, sands, or silts, collectively known as fluvio-glacial deposits. The strong, cold winds which developed round the retreating ice-front still further affected the glacial deposits by removing the finer particles as dust and re-depositing them as loess stretching well to the south of the glaciated area. It follows that the mantle of

superficial deposits which covers so much of the European Plain varies enormously in character. One may distinguish:

(i) the morainic ridges, often largely built up of large boulders, though ridges of finer material are also common;

(ii) stretches of boulder clay or till—typically stiff clay consisting of finely powdered rock, in which are embedded huge numbers of boulders but sometimes sandy and devoid of boulders. Boulder clay country is often hummocky: the hummocks may be well drained and comparatively fertile, the hollows water-logged and marshy. Much of the central plain of Ireland is of this character, the hummocks or drumlins being separated by tracts of almost useless bog;

(iii) stretches of gravel and coarse sand affording poor soil owing to its very light and porous nature. Such tracts are often marked by moorland or sterile heathland;

(iv) stretches of loess (the *limon* of the French)—the most fertile of all, and frequently affording very valuable tracts of agricultural land.

The glacial deposits as a whole were called “diluvial” by the older geologists. The word “diluvial” indicates a long-deceased belief that these deposits were formed during Noah’s flood; the word unfortunately still persists in some geography books. It will be seen that some glacial deposits can be very fertile, but others are very unfavourable to agricultural development. The struggle of Danish, North German, and Polish agriculturalists against unfavourable soil conditions is a factor of great geographical importance.

The Great European Plain fades eastwards into Russia, where glacial deposits of the type already described cover most of the surface. It will be noted that the plain, as described here, embraces, in its broad sense, the whole of the British Isles (south-east of the Highlands of Scotland and north-western Ireland), western and northern France, Belgium, Holland, northern Germany, Denmark, southern Sweden, and Poland. It follows that, other factors such as climatic and economic being comparable, these areas have many characteristics in common, and the geography of the European Plain should be studied as a whole.

The Young Fold Mountains. The complicated series of young fold mountains, mostly of Tertiary or “Alpine” age, which occupy the southern half of Europe may be understood most simply by taking the great mountain knot of the Alps as a starting-point (see Fig. 272). The Alps themselves form a short curve from west-south-west to east-north-east. The western end of the chain swings southwards, then eastwards, and then runs south-eastwards through Italy as the Apennines, curving westwards again through the toe of Italy into Sicily. From Sicily to North Africa there is only a small gap, and

the same line forms the important Atlas Mountains of Africa. The Atlas Mountains consist of two or more parallel ranges. A branch curves northwards and runs into Spain as the Sierra Nevada.

From the western end of the Alps another branch runs south-westwards, but it is soon cut off by the sea, to be continued later as the Pyrenees and the Cantabrian Mountains.

From the eastern end of the Alps there are really three main branches. One runs south-eastwards as the Dinaric Mountains into the Balkan Peninsula, where it divides. A second runs eastwards and is cut across by the Danube, only to be continued in a long curve like an "S" written backwards, forming the Carpathians, Transylvanian Alps, and the Balkan Mountains. The third branch forms a small loop to the north, surrounding the plateau of Bohemia. Close to the Alps on the north-west lies a small range, the Jura, parallel to the main ranges of the Alps. Enclosed or partly enclosed by these fold mountains are plateaus and plains. Many of the plateaus consist of old rocks which have formed resistant massifs. Nearly the whole of Spain is occupied by a high plateau called the Meseta. In the south of France, to the west of the Alps, lies the Central Plateau. The Vosges and Black Forest, separated by the Rhine rift, lie north of the Jura. North of the Alps a series of small plateaus builds up Southern Germany; the distinctive Bohemian or Czech plateau we have already noted. It may be mentioned here that the Mediterranean Sea has been largely explained by the "foundering" of blocks of the earth's surface; the islands of Corsica and Sardinia may be looked upon as remnants of these masses.

The most important plains enclosed by the mountain chains are the Valley of the Po or the Plain of Lombardy in Northern Italy, and the Great Hungarian Plain.

Until comparatively late in geological times the greater part of what is now southern Europe and the Mediterranean was occupied by an extensive sea known as the Tethys. Great thicknesses of limestone and other sediments were laid down in this sea, and when the Tertiary, or Alpine, earth movements were initiated and the Tethys proved an area of weakness, these sediments formed the bulk of the material of which the mountains were built.

As a whole the young fold mountains are not rich in minerals. Coalfields are few or absent; oilfields occur on the flanks in Roumania, Russia, and Poland; but the chief power resources—water-power or white coal—are due to an entirely different factor. The blocks of old rocks enclosed within the folds are, however, often richly mineralized, as in Spain. Agriculturally the soils afforded by the old plateaus and the young mountains are poor; further, the Mediterranean climate does not encourage the rapid formation of soil. Attention, therefore, is riveted on such broad alluvial plains as that of the Po, or stretches of young rocks such as the Hungarian

Plain. The wetter parts of Mediterranean lands can, however, be very fertile and there are some stretches of volcanic lavas, especially basalts which have yielded a rich soil.

The Rivers of Europe. Europe has many rivers; most of them are small, but they are important because they are of great use to the busy industrial countries through which they flow. We may separate the larger rivers into three groups:

- (a) Rivers flowing northwards from the fold ranges to the sea on the north side of the mountains.
- (b) Rivers on the south side of the mountains.
- (c) The rivers of Russia.

Rivers Flowing Northwards. In France are the Loire and the Seine; in Germany, the Rhine and Elbe; and in Poland, the Oder and Vistula.

Rivers to the South of the Mountains. This group includes the rivers of Spain and Portugal—the Douro, Tagus, Guadiana, and Guadalquivir emptying into the Atlantic Ocean, and the Ebro into the Mediterranean. In France is the Rhone, and in Italy the Po. One of the most important rivers of Europe is the Danube, which rises to the north of the Alps, but flows east-south-eastwards, cutting through three important ranges before it reaches the Black Sea.

The Rivers of the U.S.S.R. The longest river in Europe is the Volga, which does not enter into the ocean, but flows into the largest salt lake in the world—the Caspian Sea. More than half European Russia lies in the basin of the Volga. In the south are the Dniester, Dnieper, and the Don, flowing into the Black Sea; farther north, the Western Dwina flows into the Baltic and the Northern Dwina into the Arctic Ocean.

The small but important rivers of the British Isles will be separately considered.

The Mineral Resources of Europe

(a) Coal. The important coalfields of Europe are mainly of Carboniferous age, and are associated with those islands of older rock which lie among the later strata covering the North European Plain. Sometimes the coalfields are found on the borders of ancient rocks, as around the Central Massif of France; often part or whole of the field is hidden beneath younger rocks.

(b) Oil. The somewhat scanty oil deposits of Europe are associated with a few fields occurring usually on the flanks or amongst the foothills of the young fold mountains mainly in Roumania and Russia.

(c) Water-power. The water-power resources of Europe may be considered here, and are, of course, associated mainly with the mountainous areas; but Europe has the great advantage in this

connection of a rainfall throughout the year in most parts outside the Mediterranean countries. The comparative mildness of the climate in north-west and central Europe results in the water brought by the rain being available throughout the year.

(d) Metalliferous minerals. Europe on the whole is not very rich in metalliferous minerals, but those which occur are associated particularly with the blocks of ancient rocks, more especially the smaller blocks of this character which lie in the south in the fold ranges of the Alpine system, or with the islands of ancient rock in the North European Plain. A very important exception is iron ore. The bulk of the iron ore mined in Europe is sedimentary ore, lower in quality, but large in quantity, which occurs among the sedimentary rocks of the Northern European Plain. The iron ores of central England and the deposits of Lorraine in France belong to this category.

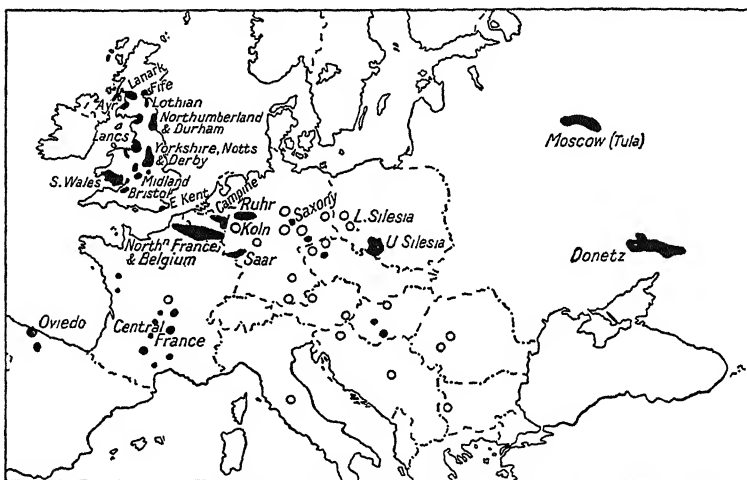


FIG. 274.—The coalfields of Europe.

Solid black areas or dots show fields of bituminous coal; circles indicate the principal lignite or brown coalfields.

Climate. In general, it may be said that a number of factors have a determining influence on the character of European weather and climate. The factors may be grouped as follows:

(a) The western coasts of the continent are bathed by a warm current—the North Atlantic Drift, which is a continuation of the Gulf Stream. The existence of this warm current, especially round the British Isles, has undoubtedly an important effect in ameliorating winter conditions. But the effect of the warm waters themselves is enormously enhanced by the prevalent south-westerly wind; for the warmth is communicated through the winds and not by the actual warm current.

(b) According to the modern concept of air-mass meteorology, a very important difference is found between cold Polar air and warm air coming from Tropical regions. The position and amount of the cold Polar air varies with the season. Its margin, the Polar front, in winter may be regarded as following very roughly the 32° F. isotherm. The currents of warm tropical air which reach Europe as the Westerlies exert their influences on the remainder of Europe. It is the friction between the current of Tropical air (maritime Tropical or mT air) and the cold Polar air (maritime Polar, mP, or maritime Arctic, mA air) that gives rise to the succession of cyclones which we associate with the Polar front. A continuous succession of cyclones passes across Iceland in a north-easterly direction; and if one takes an average of such conditions, one gets the conception of a semi-permanent low-pressure system situated approximately, as our weather reports say, off Iceland.

(c) The configuration of Europe, particularly the existence of the Mediterranean Sea and its continuation in the Black Sea, as well as, to a less extent, the existence of the Baltic Sea, permits the penetration eastwards of oceanic conditions much farther than would otherwise be the case. So that whereas the Mediterranean Belt in other continents is comparatively small, that around the Mediterranean Sea itself is very extensive in an east-west direction.

Winter Conditions. Owing to the warm currents of the sea and the wind systems, in the winter months the whole of Europe, with the possible exception of Iceland, lies in the belt of the westerly winds, thus enjoying the warm, moisture-laden winds from the Atlantic Ocean. The extra-tropical, high-pressure belt at this season lies well to the south of Europe, over the Sahara and its continuation to the Atlantic, that is, to the south of the Azores. But the eastern part of the continent at this season is very near the great land mass of Central Asia, which gets extremely cold. One may picture a great mass of cold, heavy air centred over Asia and eastern Europe, giving rise to a permanent high-pressure system in the winter. The warm moisture-laden air masses from the Atlantic move up against this as against a wall, and either find their way away to the north-east past the coast of Norway, or they escape to the south along the Mediterranean. At times this great high-pressure system of eastern Europe, with its cold, out-blowing winds, extends its influence even as far as the eastern shores of the British Isles and gives rise there to spells of cold and frosty, though often sunny, weather. Indeed, it may be said that the winter weather of the whole of Europe is determined by the relative strength or importance of the three great pressure systems: the semi-permanent low-pressure system over Iceland, the permanent high-pressure system over eastern Europe, and the high-pressure system south of the Azores. Bearing these facts in mind, it is not difficult to understand why in

the winter months it gets steadily colder as one travels eastwards in Europe, and that the isotherm of 32° , or freezing-point, divides the continent roughly into two halves. Nor is it difficult to understand why the whole of the western and Mediterranean margins receive a considerable proportion of their rain in the winter (more than half the total in the west of the British Isles, western France, and the Mediterranean), whereas as the result of the cold, out-blowing winds, precipitation of any sort is less in eastern Europe in winter than in summer.

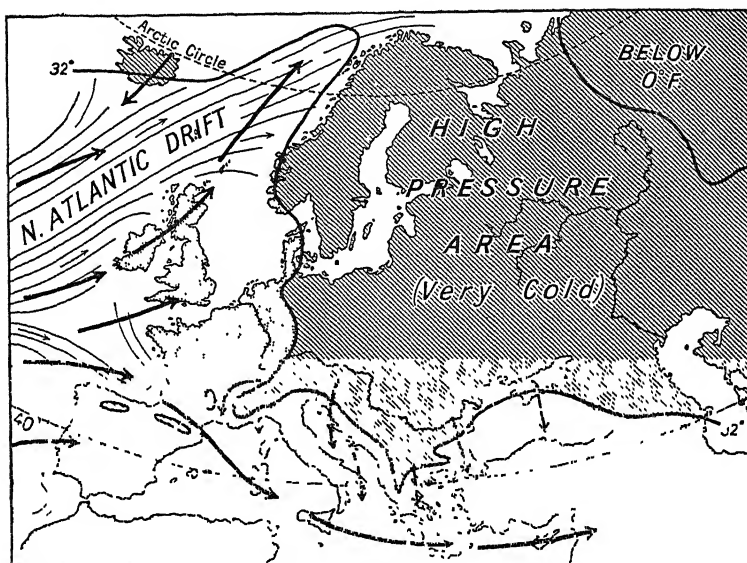


FIG. 275.—Climatic conditions—winter. Average surface temperatures are shown, *not* sea-level isotherms.

In western and southern Europe most rain falls where there are mountain ranges to intercept the winds; and the rainfall map of Europe is thus a very complex one, owing to the numerous small mountain ranges.

Summer Conditions. At this season the wind systems of the world have moved to the north, so that only the northern part of Europe is under the influence of the Westerlies. The southern part of Europe—namely, the countries surrounding the Mediterranean Sea—lies within the influence of the high-pressure belt which surrounds the globe just outside the Tropics. The high pressure reigning in the summer months over the Mediterranean prevents the penetration of the cooling or rain-bearing winds from the Atlantic Ocean; consequently the Mediterranean lands suffer from considerable heat, and comparative or even complete rainlessness—the typical Mediter-

anean climate. In the Atlantic the high pressure centre of the Azores, which forms part of this belt of high pressure, is north of its winter position, and frequently extends its influence as far as the British Isles. On the other hand, the Polar front is farther to the north, and the belt of cyclones which is associated with it tends to lie rather to the north of the island of Iceland, and to affect such regions as the British Isles far less than in the winter.

In eastern Europe the conditions of winter are reversed. The great continental land mass becomes greatly heated, and a large low-pressure area is the result. There is a tendency for the low

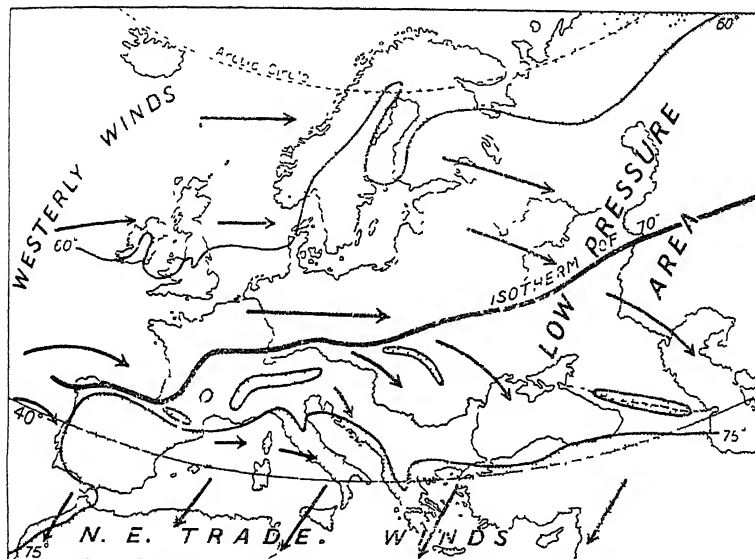


FIG. 276.—Climatic conditions—summer. Average surface temperatures.

pressure to be particularly marked over southern Russia, and towards this area the rain-bearing winds from the Atlantic blow, and result in the light spring rain of the steppelands of south-eastern Europe. Most of central and eastern Europe thus have the greater part of their rain, that is to say, more than half their annual amount, in the summer half of the year rather than in the winter.

The south-westerly winds do not blow steadily, but travel across the continent rather as a succession of cyclones or depressions with intervening wedges of high pressure, which characterize the whole of the westerly wind belt. Thus the rainfall of Europe brought by these winds is partly orographical, partly cyclonic in its origin; with the result that, although the rainfall on the mountains is nearly always heavier than on the lowlands, even as far from the Atlantic as south-eastern Europe the rainfall is sufficient for agriculture, only

in the south of the Soviet Union surrounding the Caspian dropping below the minimum amount for agriculture.

Climatic Regions. The continent of Europe includes five of the great climatic regions of the world:

- (a) The Mediterranean.
- (b) The Cool Temperate Oceanic.
- (c) The mid-Latitude Continental or mid-Latitude Grasslands.
- (d) The Cold Temperate or Coniferous Forest.
- (e) The Tundra.

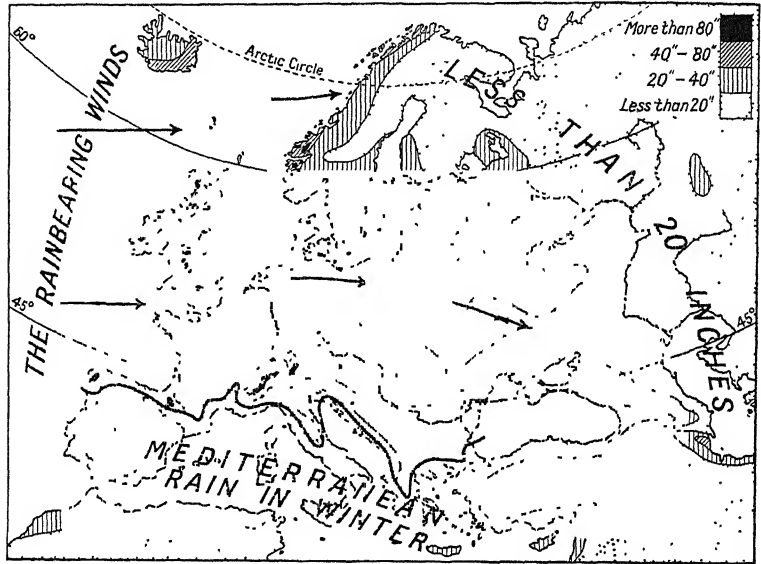


FIG. 277.—Rainfall map of Europe for the whole year.

The thick black line marks the northern limit of the Mediterranean region.

Owing, however, to the increasing severity of the winter as one passes eastwards in Europe, the Cool Temperate Oceanic can easily be divided into three sub-divisions:

- (a) North-western Europe, with its mild winters, having everywhere a temperature of over 32° on an average in the coldest months, and cool summers.
- (b) Central Europe, where the winters are colder, the average for the coldest month being below freezing, and the summers warmer.
- (c) Central Russia, where the winters are very cold, and the summers hot, but where the rainfall is sufficient to give rise to the same deciduous forests that characterize north-western and central Europe.

These divisions are shown in Fig. 278.

It is not easy to define climatically the southern limits of the Cold Temperate type of climate, but usually to the north of the dividing line the average temperature of one month only rises above 60° , whilst the length of the summer is insufficient for the growth of the cereal wheat. Moreover, the dividing line chosen is the all-important division between the Coniferous Forest or Taiga, and the Deciduous Forest.

Agriculture in Europe. Excluding for the moment any consideration of the U.S.S.R., there are certain features common to nearly the whole of Europe in matters relating to agriculture.

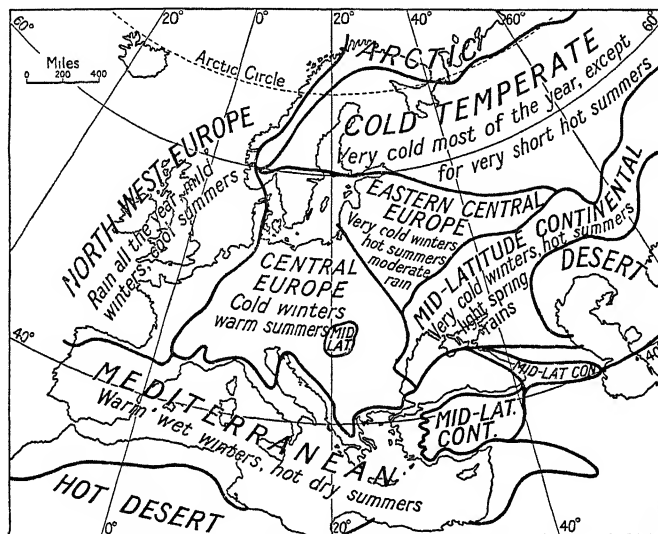


FIG. 278.—Climatic regions of Europe.

(1) No European country can produce all the foodstuffs and raw materials essential to modern civilized existence, for the simple reason that the whole continent lies in temperate latitudes.

(2) Further, the industrialized or densely populated regions are unable to produce sufficient of the staple foodstuffs for the sustenance of the people, and large quantities must of necessity be imported. It follows almost automatically that such foodstuffs as are produced are grown under conditions of "intensive farming," with the characteristic features of mixed arable-livestock farms, rotation of crops, manuring, high yields per acre. It follows, too, that there is essentially a specialization in the more paying crops—in other words the actual produce of agriculture is determined by economic rather than geographic factors. Denmark is famous for bacon and butter not because the geographical conditions are pre-eminently suitable but because of a specialization undertaken for economic reasons.

(3) It follows that the geographical factors determine the broad belts wherein the cultivation of any specified crop is possible, the actual areas where cultivation is undertaken are determined by economic factors.

Before the First World War Russia was the world's largest exporter of wheat, barley, oats, rye, flax, and hemp, and second in butter. During and after that war the exports entirely disappeared, and Russia's place was taken by such new countries as Canada, Argentina and Australia, and, latterly, the United States.

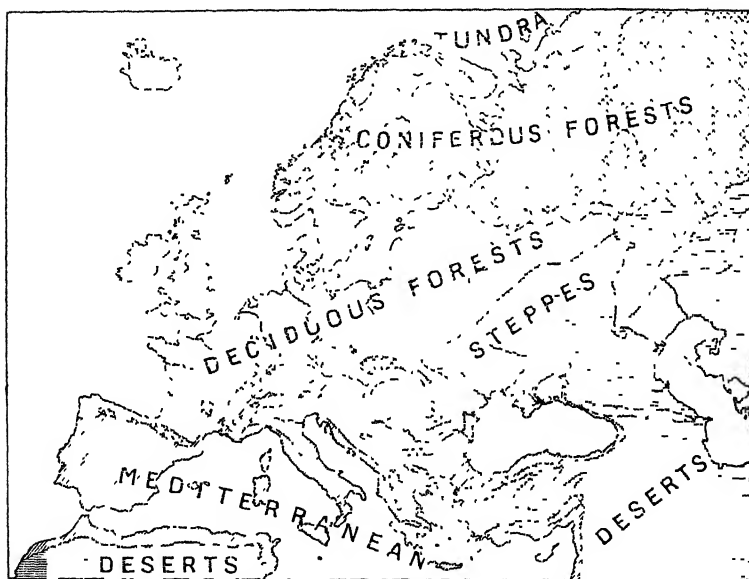


FIG. 279.—The natural vegetation of Europe.

Wheat. When one thinks of the vast wheat fields of Canada, the United States, the Argentine, and Australia, it is at first surprising to realize that the small countries of Europe, *excluding* the U.S.S.R., grow nearly one-third of all the wheat of the world, and nearly as much as North America. But the grain is nearly all grown for home consumption; in the inter-war years only Hungary, Roumania, Yugoslavia, Bulgaria, and Poland (countries which share the geographical conditions of the Russian steppes), had a surplus available for export. With the exception of Yugoslavia all these are countries now behind the Iron Curtain, having little trade with countries outside. On the other hand, with the exception of Brazil and Japan and lately India, Egypt, and Central America, *all* the big importers of wheat are European countries—easily led by Great Britain.

A glance at the two maps showing wheat in Europe and North Africa shows that the cultivation of spring wheat is practically confined to the steppelands of the Soviet Union, with their severe winter conditions. The remainder of Europe and also the steppelands grow winter wheat. The map showing its distribution illustrates rather well what may be called the limiting factors in its cultivation.

- (a) To the north there is little beyond the July isotherm of 60° F.—beyond this the summers are too short or too cold.
- (b) There is an obvious absence of cultivation in mountainous regions such as the Alps and Carpathians.

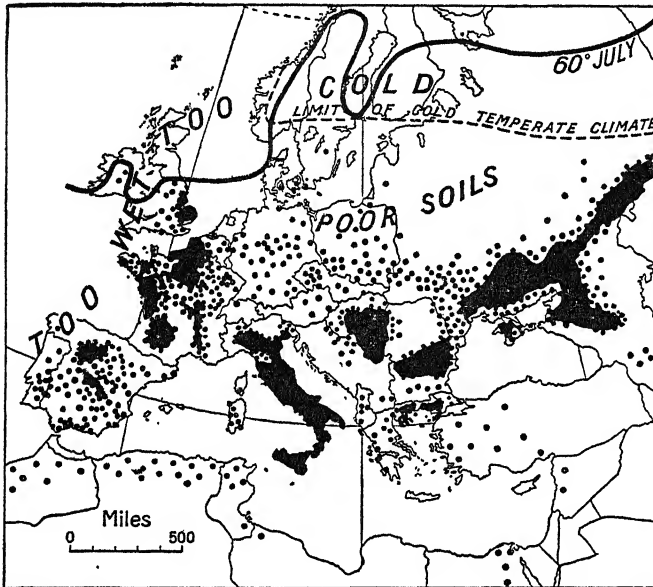


FIG. 280.—Winter wheat in Europe and the Mediterranean lands.

- (c) Excessive moisture is the obvious deterrent factor in hilly, western Britain and north-western Spain.
- (d) Poor soil conditions are in the main responsible for the sparse cultivation in the North European Plain through Germany and Poland.

The most suitable regions for wheat in Europe are thus the drier, warmer parts of the Cool Temperate region, the more fertile areas of the Mediterranean region, and the mid-Latitude Continental or Steppe region.

Rye. Rye is wheat's poor relation. It grows best with the same conditions as wheat, but is actually grown where soil and climatic

conditions are not quite good enough for wheat. Notice its concentration on the poor soils of Germany, Poland, and Russia; its absence from the Mediterranean, where, if the *soil* is good enough, the climate favours wheat.

Oats. Oats demand roughly the same conditions of soil and climate as wheat, except that they will ripen under conditions of greater moisture and less sunshine, but will not flourish under dry, sunny conditions. Hence oats are almost absent from the Mediterranean and Steppeland regions, but are more widespread over northern Europe. Although the trade is small when compared with

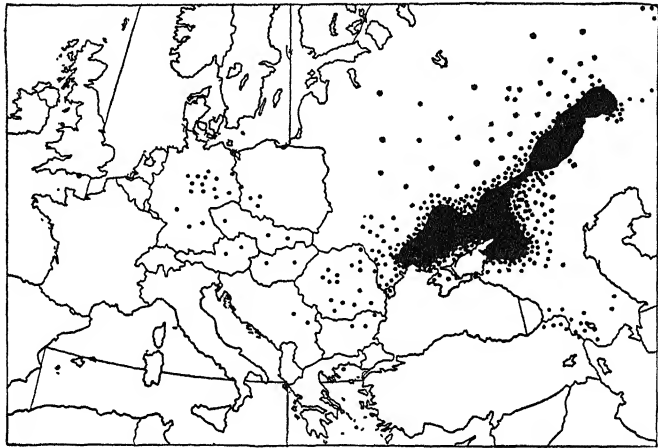


FIG. 281.—Spring wheat in Europe.

that in wheat, it is again the thickly populated, industrialized countries of Europe which purchase, the new countries of the other continents which supply. Oats have an important function as the great fodder grain of the dairying regions round the Baltic Sea. If a damp summer prevents ripening, both oats and rye can be cut green for fodder. It is only in Scotland and Scandinavia that oat-meal and porridge are important items of human diet.

Barley. Barley is a grain which again appreciates the same conditions as wheat, but which avoids the damp, sunless lands possible for oat cultivation, and seeks, above all, sun. Barley is able to utilize the long, sunny days of the northern summer, even when that summer is very short, and so it is found ripening within the Arctic Circle, whilst flourishing also in the bright, sunny lands of North Africa. In North Africa barley is a staple food grain; in northern Europe malting barley for beer becomes of great importance. Indeed, the chief purchasers of barley are the great beer-drinking nations—Britain, Germany, Holland, and Belgium.

Maize. The distribution of maize cultivation in Europe illustrates the need of this grain for warmth and moisture. Very little is grown north of a line which marks the position of the 70° F. isotherm for July (contrast wheat), whilst very little is grown in the dry, sunny Mediterranean region. Notice from the map the regions which lie between these limits.

Potatoes. The potato can be grown under varied conditions but prefers rather light stoneless soils where the tubers can develop, well drained, in regions with a cool temperature and well distributed rainfall. Hence the similarity in distribution to rye, in the light glacial soils of the North European Plain.

Sugar Beet may be specially noted because of its concentration in certain areas and certain areas only—determined partly by the presence of rich, deep, stoneless soils (*e.g.* Fenlands of England), partly by economic considerations. Similarly, *flax* is curiously limited in its distribution—largely owing to labour requirements—to northern Ireland, Belgium, and the countries bordering the Baltic on the east.

The vine is favoured by dry, sunny positions—hence the Mediterranean concentration and the importance of the warmer parts of North-west Europe.

The olive may be said by its distribution almost to define the area which enjoys a true Mediterranean climate, whereas *oranges* and *lemons*, though regarded as equally Mediterranean, are restricted to a few main areas—oranges to the Valencia district of Spain, the Naples district of Italy, and the Jaffa district of Israel; lemons to Sicily.

Animals. Horses are the old plough and draught animals of northern Europe and the steppelands: mules and asses of Mediterranean Europe. Cattle are especially important on the wetter pasture lands of north-western Europe, whilst there is a very definite concentration of dairy cattle in certain countries and areas—such as Holland, Denmark, and Brittany. Pigs are concentrated in Denmark, northern Germany, Holland, and Belgium, and depend partly on the availability of barley, potatoes, and dairy by-products (especially skimmed milk), though Denmark deliberately developed its bacon industry on the basis of imported feeding-stuffs. The goats of Europe are concentrated in the dry hills of the Balkan Peninsula; they are also numerous in the dry lands of North Africa and Asia Minor. Sheep present what seems a curious distribution, being remarkably numerous in the British Isles, Balkan Peninsula and Italy. It is obvious in the case of sheep that economic considerations have completely upset the normal geographical distribution. In Germany and Belgium, for example, the land is needed for other purposes—sheep have been crowded out.

European Fisheries. The fishing grounds of north-western

Europe extend from Lapland to the coast of Morocco, and include the coasts of Iceland. But the most important area is the North Sea. Inshore fishing rights are reserved, but the main North Sea grounds are shared by British, Norwegian, German, Dutch, and other fishermen. British fisheries in all support nearly a quarter of a million people.

Other important areas include the western Mediterranean (sardines, anchovies, and tunny), and the tidal estuaries such as the mouth of the Thames and Rhine, where oysters flourish.

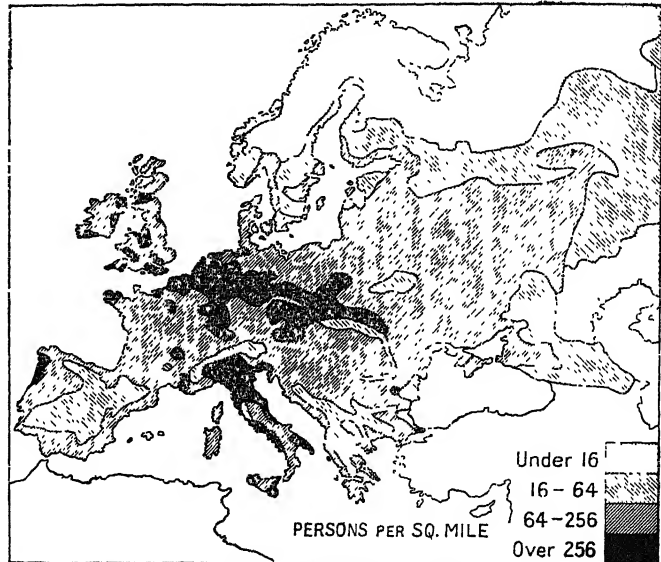


FIG. 282.—The Population of Europe.

Of inland fisheries, those of Russian rivers are, perhaps, the most famous, because of the production of caviare (sturgeon roes).

The Distribution of Population in Europe. The broad features of the density of population in different parts of Europe are shown in Fig. 282.

In this map, which is very much generalized, the four tints used correspond roughly with the following types of area:—

(a) The black areas are in the main industrial areas. It is only in a very few of the most fertile agricultural tracts that the population approaches 256 to the square mile. Although in China agricultural populations—with a very low standard of living combined with intensive agriculture and a constant danger of famine—may reach even 2,000 and 3,000 per square mile, and in India may reach equally

high figures, it is generally agreed that one of the most prolific of grains—rice—cannot support a population of more than 700 or 750 to the square mile. Thus while the black parts of this map cover some of the rich agricultural area such as the northern plain of Italy, these tracts include also some industrial towns.

(b) The heavily lined areas (with a population of 64 to 256 persons per square mile) correspond broadly with the chief agricultural areas. It will be noted that the northern limit coincides roughly with the northern limit of the deciduous forest belt; in the coniferous forest belt comparatively little agriculture is possible. It may be noted that even the richest agricultural areas such as the Black Earth belt of the U.S.S.R. and the Paris Basin do not support a population as dense as 256 to the square mile.

(c) The lightly lined areas (with a population of 16 to 64 persons per square mile) correspond broadly with the tract where physical conditions limit agriculture. Some of the factors are aridity (*e.g.* in Spain and south-eastern Russia), elevation (in the Alps and Carpathians), aridity and elevation (in the Balkan mountains), cold (in the northern belt). The factor of excessive rainfall operates in the north-western British Isles and in western Norway.

(d) The dotted areas correspond with the regions where cold (in the north) or aridity (in the south-east) make close settlement almost impossible.

In studying the countries of Europe it is very important to notice the relations in which they stand to the great natural regions. They may be grouped as follows:

Countries of the Mediterranean. Spain and Portugal, Italy, Albania, and Greece are the European Mediterranean countries; to these should be added Turkey, Syria, Lebanon, Jordan, and Israel in Asia; Morocco, Algeria, and Tunisia in North Africa. Yet not one of the countries surrounding the Mediterranean Sea is wholly Mediterranean. Along their northern borders Portugal and Spain enjoy areas with the North-west European type of climate; Italy and Greece have regions with a Central European type of climate; whilst the others have considerable desert areas. This is important, because it means that the European Mediterranean countries also share in the products characteristic of the cooler, north European type of climate.

Countries of Central Europe and the Danube Basin. Here Switzerland and Austria share the mountainous flanks of the Alps and the neighbouring mountains. Hungary lies in the heart of the Hungarian Plain, but does not include the full geographical extent of that plain. Fragments of the Hungarian Plain lie in Czechoslovakia, Yugoslavia, and Roumania, which otherwise include most of the remainder of the mountain belt of Central Europe. Bulgaria is mainly a hilly country, with a Central European type of climate,

but Roumania enjoys a portion of the Steppeland region from its neighbour Russia.

Countries of the Great European Plain. France, Belgium, Holland, Denmark, Germany, and Poland are the countries which occupy the Great European Plain; but of these it should be noted that France has an important trace of Mediterranean country, Germany a considerable part of the hill country of Central Europe, and only the smaller ones are essentially countries of the plain. Perhaps in this group we should include the British Isles; and it is interesting to notice that they lie wholly within one climatic region—that of north-western Europe.

The Countries of Fennoscandia. The three countries of Fennoscandia are Norway, Sweden, and Finland, sharing the ancient block which makes up the northern part of Europe and which is actually continued in the Highlands of Scotland. From the climatic point of view, Fennoscandia lies mainly in the Cold Temperate Coniferous Forest Belt, but southern Sweden should properly be grouped with the plainlands of northern Europe, and has a Central European type of climate. The coastlands of Norway, exposed as they are to the ameliorating influences of westerly winds, enjoy the North-west European climate and its inherent advantages. Finland, which was the northernmost independent country of the world until Iceland separated from Denmark and still extends farther north than that country, lies almost wholly within the Cold Temperate regions.

Eastern Europe. Eastern Europe is synonymous approximately with the U.S.S.R., and it is noteworthy that the Soviet Union includes in her vast extent in Europe representatives of the principal climatic regions, if one excepts North-western Europe. From the Tundra on the north, through the Cold Temperate, the Central European type, to the Steppeland type, and even including, on the southern fringe of the Crimea, a tiny strip which may be called Mediterranean.

Out of the twenty-five countries, five are kingdoms with overseas possessions (Britain, Norway, Belgium, the Netherlands, and Denmark), two are kingdoms without foreign possessions (Sweden and Greece). All the others have a republican form of government: four of them (France, Spain, Portugal and Italy) with overseas possessions.

THE BRITISH ISLES

Position and Size. The British Isles comprise the two large islands of Great Britain and Ireland, together with a number of smaller islands, lying off the north-west coast of the continent of Europe. The English Channel, narrowing eastwards to the Strait

of Dover, which is only twenty-one miles wide at the narrowest part, separates the south of England from France; the North Sea lies between Britain and Holland, Germany, Denmark, and Norway.

The island of Great Britain consists of the three countries, Scotland in the north, Wales in a part of the west, and England occupying the remainder. England, Scotland, and Wales have been joined under one king since 1603. Since 1920 Ireland has been divided into "Northern Ireland" and the "Irish Republic." Northern Ireland has a parliament of its own, but is otherwise closely united with Great Britain; but the Irish Republic is an independent republic, having a president of its own. "United Kingdom" used to mean



FIG. 283.—Map of the British Isles showing the shallow continental shelf.

Those parts of the sea unshaded are less than 100 fathoms (600 feet) in depth.

the United Kingdom of Great Britain and Ireland; now it means the United Kingdom of Great Britain and Northern Ireland. The distinction is important when comparing statistics, and care must always be taken when studying figures in official publications to see whether they apply to England and Wales only, or to Great Britain or to the United Kingdom. It should be noted that the Channel Isles and the Isle of Man enjoy certain privileges in matters of government, and are sometimes included, sometimes excluded, in statistical compilations. The following table is given for reference purposes:

	Area (sq. miles)	Population 1921	Population 1931	Population 1951
United Kingdom	94,281	—	—	50,423,668
England . . .	50,874	35,681,019	37,789,738	41,147,938
Wales . . .	7,466	2,205,680	2,158,193	2,596,986
Scotland . . .	30,405	4,882,497	4,842,554	5,095,969
Isle of Man . . .	221	60,284	49,338	55,213
Channel Islands . . .	75	90,230	93,061	102,770
Northern Ireland	5,240	1,256,561 ¹	1,246,000	1,370,709
Irish Republic .	26,600	2,971,992 ¹	2,965,854 ²	2,960,593

¹ 1926.² 1936.

The British Isles lie mainly within the quadrilateral formed by the two lines of longitude 0° and 10° West, and the two lines of latitude 50° and 60° North. Although the ancient Greeks realized that the earth was a sphere, the known world to them was an area centring around the Mediterranean Sea, so that the British Isles lay on the fringe of the area. Indeed, right into the Middle Ages Britain occupied this position. The most accessible part of the country was that facing the continent of Europe, a fact which is reflected in the use of the name Albion for the whole of Britain, based merely on the white chalk cliffs of the south-east. Ireland and the northern parts of Scotland remained almost unknown countries. The re-discovery of America by Columbus, in 1492, and the rapid growth to importance of the lands on the western side of the Atlantic revolutionized the importance of Britain's geographical position. Instead

of occupying a terminal position on the fringe of the known world, Britain now occupied a central position on the eastern shores of the Atlantic Ocean, which from that time forward replaced the Mediterranean as the heart of the world's life and commerce.



FIG. 284.—The world position of the British Isles—London the centre of the land hemisphere. Note, however, the obstacle formed by the Polar ice-regions.

It is a well-known fact that Britain lies in the centre of the land hemisphere, but what is not always realized is the remarkable way in which Britain acts as a door-keeper for the whole, or nearly the whole, of Europe. If one takes a globe and attempts to mark out on it

the shortest routes between the capitals of all the northern and central European states on the one hand, and New York or the busy industrial cities of the New

World on the other, one finds that these shortest routes pass across the British Isles. The importance of this is well seen in modern air transport.

Physical Features. The advantages accruing to the British Isles by virtue of their world position have been greatly enhanced by the structure of the islands themselves. The seas surrounding the islands are shallow, and, as mentioned above, the extensive continental shelf affords breeding and feeding grounds for the fish which from the earliest times have attracted Britons to the sea. The British Isles have a very long coastline, for the coasts are so deeply indented that no part of the islands is as much as one hundred miles from the sea. The tide-scoured inlets afford excellent harbours and, further, there are no high mountains to hinder communications with the interior. Though many parts of the islands are hilly, and even mountainous, the greatest elevation reached in England and Wales is under 4,000 feet, whilst the highest peak in Scotland, Ben Nevis, attains but 4,400 feet.

The British Isles are divisible into a number of fairly well-defined physical units, as shown in Fig. 285. Scotland falls into four divisions.

The Highlands form a great dissected plateau occupying the northern half of Scotland, divided into two by the deep trench of Glen More, which separates the North-West Highlands from the Grampians. The scenery of the plateau has been moulded to a large extent by ice action during the Great Ice Age. The west coast is a typical fiorded coast with wild, rocky scenery. The fiords of Scotland, like those of Norway, are deep, steep-sided inlets of the sea, often marked by sharp, almost right-angled bends, and by a submerged ridge near the mouth. They are generally believed to have been excavated by tongues of ice working along lines of weakness caused by two sets of great cracks at right angles.

North-East Scotland is the more fertile land along the east coast of the Highlands.

The Southern Uplands are formed by a broad, low fold range running with a north-east to south-west trend (Caledonian trend) across the south.

The Midland Valley, the most important part of Scotland, lies between the Highlands and the Southern Uplands.

England and Wales may, in the first instance, be divided very simply as shown in Fig. 285.

If a line is drawn across England and Wales from south-west to north-east, it is found that the old rocks and the mountainous regions lie to the north-west, whilst to the south-east are mostly young rocks and lowlands. To the north-west there are three main areas of mountains:

The Lake District of the north (Cumbrian Mountains).

Wales, consisting of very old rocks in the north (Cambrian Mountains), but with a great coal basin in the south (South Wales Coalfield).

Devon and Cornwall, or Cornubia, occupying the peninsula of the south-west.



FIG. 285.—The natural regions of the British Isles.

Then, running down the centre of the north of England is its backbone, the *Pennine Range*. Part of the great *Midland Plain* wraps round the southern end of the Pennine Upland and separates it from the other hill masses.

The *south-east of England* consists of low ridges running from south-west to north-east, marking the outcrops of successive beds of rock. In the extreme south-east is an arch, or anticline, running from east to west (the Weald), whilst London lies in the syncline (London Basin).

Ireland is shaped like a saucer, a central lowland surrounded by a broken and irregular rim of mountains. The mountains in the north (Donegal Mountains) once joined the Highlands of Scotland; the mountains of the south-east (Wicklow Mountains) were once part of the Welsh mass.

Rivers. The rivers of the British Isles are short, and since the mountains are usually on the western sides of the islands, most of the longest ones flow eastwards. The rivers are not, as a rule, swift enough to supply hydro-electric power (though some of the Scottish streams are sufficiently swift or the water can be suitably impounded, and in Ireland the river Shannon has been harnessed in recent years); they are too shallow to be used by river steamers, but they are very important commercially, because their mouths are often navigable by the largest ocean-going vessels and afford excellent harbours. They are rarely subject to floods, but have a gentle flow of water, and tides help to keep the mouths clear all the year round. They are rarely, if ever, frozen. Look carefully at the map, and note the position of these rivers, with the ports which lie near their mouths: Don, Dee, Tay, Forth (east of Scotland), Tyne, Tees, Humber, Thames (east coast of England), Clyde (west of Scotland), Mersey, and Severn (west of England). The only large river in Ireland is the Shannon. The fact that the majority of English and Scottish rivers flow eastwards is a fortunate circumstance, from the economic point of view, since their mouths face the great river outlets of the Continent. Though not mountainous, practically the whole surface of England is hilly, and the relative unimportance of water transport, despite an extensive canal system, when compared with France and Germany, is due mainly to the large number of locks necessary on the canals.

British Minerals. Coal represents nearly 90 per cent. by value of all the mineral products of the British Isles, and the next mineral in order of importance, iron ore, only represents about 2 per cent. of the total value. All the other minerals of which the annual value is over £1,000,000 are non-metallic. Of the metallic minerals for which Britain was once famous, tin ore is almost the only one of any considerable value. In normal years the mining industries of Great Britain give employment to over a million people.

COAL. The ordinary geological map shows the position of the *exposed* Coal Measures. Frequently the most important parts of the fields are where the Coal Measures themselves are hidden beneath a blanket of younger rock. The relative importance of the fields is shown in Fig. 286.

The total production of coal reached a peak of 273,000,000 tons in 1913; it is now between 210,000,000 and 230,000,000 tons.

The quality of the coal differs from one field to another. Anthracite is practically restricted to the western part of the South Wales

field; other coals of South Wales are particularly celebrated as steam coals. It should be noted that practically all the coal raised in Great Britain is of Carboniferous age; there are practically no brown coals.

Iron Ores. Although the prosperity of the iron and steel industry of the British Isles was consequent to a large extent upon the association of iron ore and coal in the coalfields, comparatively little of the iron ore now mined is from coalfield regions. The

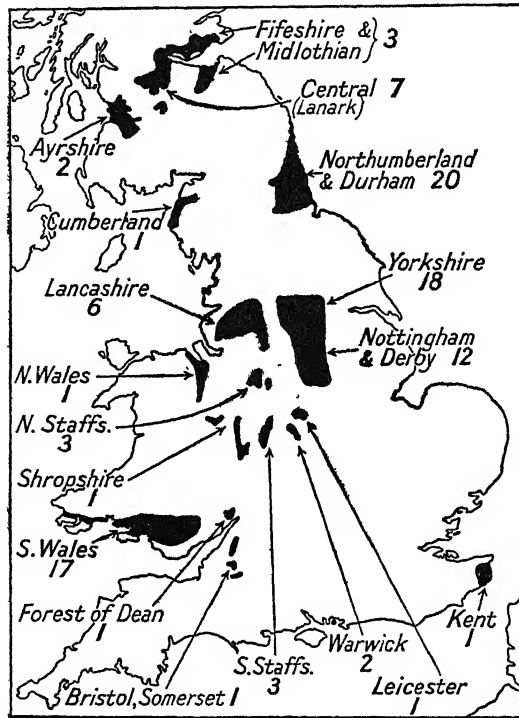


FIG. 286.—The coalfields of Britain.

The figures show roughly the percentage of the total output produced by each field.

most important iron ores are the bedded sedimentary ores of low grade but huge extent and easily mined, occurring in the Jurassic rocks, especially in the Cleveland field of Yorkshire, and in the Midlands. The coalfield where iron ore is still mined to some extent is North Staffordshire. The Cumberland and north Lancashire iron ores, mined especially near Barrow, are purer ores and occur as masses in limestone.

Metals. Amongst metallic minerals the once famous tin fields of Cornwall have now but a small output. There is a small pro-

duction of wolfram from the same area, but that of copper is now almost negligible. Lead ore is widely distributed in the British Isles, but the workings are or were all small; and lie mainly in northern England, Derbyshire, and in the Lead Hills of southern Scotland. Zinc ore was also once important.

Non-metallic Minerals. The British Isles are well supplied with building stones and road metal. Amongst the former may be specially noted the grey granite of Aberdeen and the handsome Shap granite of Cumberland; the magnesian limestones of the north-east of England; the Portland oolites and Bath freestones of the Portland and Bath districts respectively. Enormous quantities of limestone, including chalk, are burnt for the production of lime and Portland cement—the cement works using chalk on the lower reaches of the Thames and Medway are especially noteworthy. The china clay industry of Devon and Cornwall is also important; the china clay occurs as an alteration product overlying certain of the granite masses, but especially near St. Austell. Formerly clay for brickmaking was widely dug in many parts of the country, but there has been a marked tendency to the concentration of the industry in a few areas—notably at Peterborough. The fireclays and ganisters of the coalfields have, of course, special uses, and so have the pure white pottery clays such as those of Poole. The slates of North Wales and Devon-Cornwall are less important than formerly, owing to the decrease in popularity of slate as a roofing material. The decrease in importance of the Scottish oil-shales is partly the result of exhaustion, partly the competition of foreign crude oils. The most famous area for salt is Cheshire. Mention should be made of the fine moulding sands of the Midlands, very important in the iron industry. Large quantities of sand are needed in the building industry whilst the modern extensive use of concrete has led to a huge demand for gravel.

It may be noted here that Ireland is poor in minerals, which are practically restricted to small supplies of coal, aluminous iron ores, granite, and marble.

Climate. The British Isles have a milder and more equable climate than any other land so far away from the equator. This is due mainly to the warm North Atlantic Drift and the continual influence of the warm moist “Westerlies” or south-west Anti-Trades. In winter the east is colder than the west, in summer the north is colder than the south. See Figs. 287 and 288, compare them with 275 and 276. The highest land is in the west, so the greatest rainfall is in the west; eastern England lies in the “rain-shadow” of the Pennines and western mountains. Although the *general current* of air is from the south-west, actually the daily weather in the British Isles is determined by a succession of cyclones and anti-cyclones which like eddies or whirls in the main current

tend to cross the North Atlantic from west to east, and pass over the British Isles. Wet, stormy, and changeable weather is usually associated with cyclones; fine, settled weather (often with fogs in winter) with anti-cyclones.

By reference to world conditions (see Chapter III in Part I), it will be remembered that the British Isles lie between the high-pressure belt which encircles the globe in the neighbourhood of the Tropic of Cancer and the low-pressure belt which encircles the globe in the neighbourhood of the Arctic Circle. The former belt reaches its greatest intensity about the Azores; the latter about

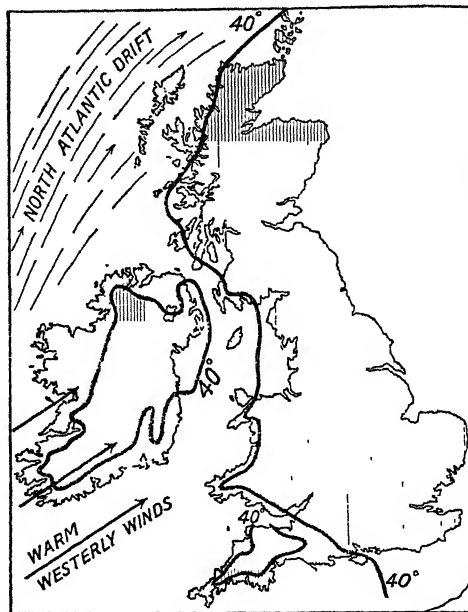


FIG. 287.—British Isles—January conditions.

In winter the west coast is kept warm by winds from off the North Atlantic Drift, and so the whole of the west coast is warmer than the east coast. Compare the temperature line of 32° shown on Fig. 275.

Iceland. Hence the constant reference in British weather reports to the permanent high-pressure centre over the Azores and the permanent or semi-permanent depression over Iceland. In winter, owing to the cold, there is a high-pressure area over Eastern Europe; in summer it is a low-pressure area. It will be obvious that the British weather is determined very largely by the relative strength or importance of these three permanent or semi-permanent pressure systems, which are, actually, closely related to normal world con-

ditions. The rainfall in the British Isles is evenly distributed through the year (see Part I), there are no extremes of temperature, so that evaporation is comparatively small. As a result, although the rainfall in parts of eastern England is as low as 20 inches per year, it is ample for agriculture, and it is rarely that the countryside is sufficiently long without rain for even the grass to become dry and brown.

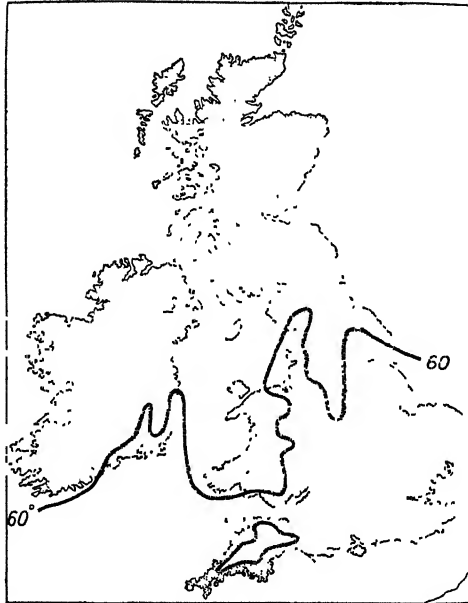


FIG. 288.—British Isles—July isotherms.

The sun is shining over the northern tropic, and the south of the British Isles is warmer than the north.

Natural Vegetation. The natural vegetation of the British Isles has now been so largely removed that it is difficult to picture the country as it was. Broadly speaking, the whole of the lowlands must have been clothed with thick deciduous forest of oak, ash, beech, birch, and other common trees of the countryside. Extensive tracts of marsh land, such as the Fen country and Romney Marsh, formed breaks in the spread of forest, whilst rising above it were the moorland tracts of the Welsh Highlands, the Pennines, the Southern Uplands and the Highlands of Scotland, as well as the grass-covered downs of the chalk country. On sandy tracts and in the north, in Scotland, coniferous forests replaced the deciduous woodland, and even on low ground the heaths, still so typical of

sandy soils, must have existed much as they are at present. It is interesting to notice that the settlements and highways of the early Britons avoided the low grounds, for these were only thick forest or marshes, and are found on the high ground, which is, at the present day, the location of comparatively few villages or towns. Whilst the

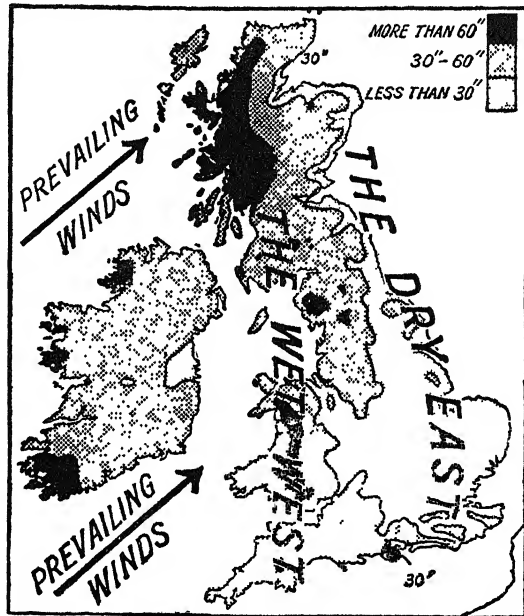


FIG. 289.—British Isles—Rainfall map.

Notice that the heaviest rainfall is on the hills and in the west. The arrows show the direction of prevailing winds

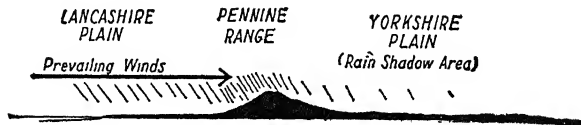


FIG. 290.—Section across the Pennine Range, showing the rain-shadow area on the east.

ancient forests have now been so largely removed, the British Isles still have many trees though few forests: numerous small woods, hedgerows with isolated trees and "park-like" country are characteristic of the country. The following table shows the utilization of the surface in the British Isles in 1950:

	Woods and plantations	Rough grazing land	Permanent pasture	Arable	Other land
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
England . . .	6	8	28	40	18
Wales . . .	6	27	29	21	17
Scotland . . .	7	57	6	17	13
Northern Ireland .	1·7	21	31	36	10
United Kingdom .	6·4	29	29	30	13
Irish Republic . .	1·7	—	45	23	30

The small area covered by woods and plantations in all parts of the British Isles is noteworthy, but much planting has been carried out in recent years by the Forestry Commission. Most of the "rough grazing land" is the heather-covered or grass moorland and the heathland which covers such huge areas of the uplands. The high percentage in Scotland is particularly noticeable.

Agriculture. The relative importance of agriculture in Britain is perhaps best gauged by noting the value of primary production and manufactures. These figures are for *Great Britain* in 1957:

	£
Agriculture	810,000,000
Fisheries	40,000,000
Mines	700,000,000
Manufactures	7,300,000,000

In its broad lines the distribution of the different types of agriculture in Great Britain is controlled by geographical factors; in the details of development, especially in recent years, the economic factors are more noteworthy. The two maps, Figs. 291–2, illustrate the first point. Most of the hilly western counties of England; Wales, and large parts of Scotland, have nearly half their surface occupied by moorland—or "rough hill pasture." Turning to the plains of the midlands and south-eastern England, arable land is concentrated in the drier eastern counties.

An essential characteristic of the intensive agriculture of Great Britain is the crop rotation. Three examples are given which have been practised; two are still used.

	Mediaeval	Old Norfolk system	Modern
1st Year . .	Fallow	Clover	Clover, or rye grass
2nd Year . .	Rye or wheat	Wheat	Wheat
3rd Year . .	Barley or peas	Turnips	Potatoes, or root crop
4th Year . .	—	Barley	Oats, or barley
5th Year . .	—	—	Barley

Clover or other leguminous crops are very important factors in the scheme since, as a result of bacteria living in their root nodules

capable of "fixing" atmospheric nitrogen and converting it into nitrogenous plant foods, they *add* to the fertility of the soil instead of detracting from it.

Mixed farming with high crop-yields is thus characteristic of British agriculture. For the long period from the late 'seventies

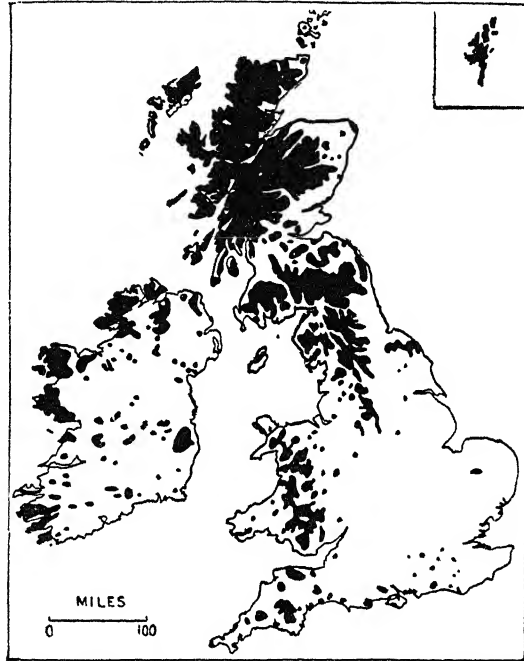


FIG. 291 —Rough hill pastures in England and Wales.

This map should be compared very carefully with the physical map. It will be seen at once that most of the moorland which, because of its use as rough grazing land, is broadly synonymous with "rough hill pastures," lies in the highland half of Britain. It occupies most of the Highlands of Scotland, the Southern Uplands, the Pennines, the heart of the Lake District, and the higher parts of Wales. Smaller areas appear on the granite masses of Devon and Cornwall, on the North Yorkshire hills, as well as on low-lying tracts of very sandy soil, as in the New Forest. In Ireland the predominance in the wet, mountainous west should be noted.

of last century to 1938 there was a steady decrease in arable land only partly offset by the increase of permanent grass because much farmland was swallowed up in town development and some poorer or marginal lands were abandoned. With the coming of war in 1939 a desperate effort was made to increase the home food supply. British farmers were in fact able to produce over 50 per cent. of the total food needed against 35 or 40 per cent. in the pre-war years.

Wheat. Wheat occupies much land in the drier eastern counties of England, but only small areas in Scotland, where the northern

limit for its cultivation is reached, and in Ireland, which is, on the whole, too damp. The average yield is 40 bushels of 60 lb. per acre, or more than twice the world average, but much has still to be imported.

Barley. Barley occupies now about 2,500,000 acres in England and Wales; less than 200,000 acres in Scotland and only a little more in Ireland. About half is grown for malting (*i.e.* beer), about half for feeding to animals.

Oats. Oats alone cover about 2,000,000 acres in England and Wales, nearly 1,000,000 acres in Scotland, and about 1,000,000 acres in Ireland. The ability of oats to withstand the cooler, damper climate of the north and the damper climate of Ireland is well shown.

Root Crops. Turnips, swedes, and mangold (all largely used for cattle and sheep food) occupy large areas in Great Britain and in Ireland. Potatoes, occupying nearly a million acres in Great Britain, cover very large areas also in Ireland.



FIG. 292.—The chief arable areas of Great Britain.

Main areas in black; mixed arable and grass dotted.

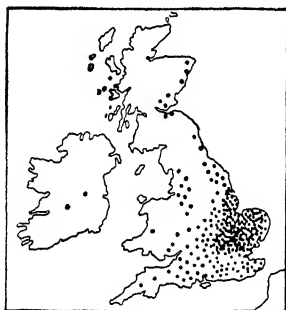


FIG. 293.—The wheatlands of the British Isles

Notice that they are mainly in the dry south-east; the west of England is too wet, Scotland is too cold.



FIG. 294.—The oat-growing regions of the British Isles.

Oats, like wheat, grow in the drier east, but they can ripen under colder and damper conditions than wheat, and so are largely grown in Scotland.

Peas and Beans are other important crops; since about 1917 *sugar beet* has grown rapidly in importance in the dry eastern counties of

England. The *flax* of north-eastern Ireland now occupies less than 4,000 acres (1957).

Orchards. Fruit orchards occupy 250,000 acres in England and Wales, 1,000 acres in Scotland. Special mention may be made of the cider-apple orchards of Herefordshire, Devon, and Somerset, and of the fruit orchards of the "home counties" supplying the London markets. Kent, along the fertile northern slopes of the North Downs, is *par excellence* the country for "small fruit"—raspberries, strawberries, currants, gooseberries, etc.—which cover 42,000 acres in England and Wales, and 9,000 in Scotland (mainly in the sheltered valleys of the east coast). Hops are mainly of importance in the Weald of Kent and in Herefordshire. Fruit and vegetable canning has become very important especially in the Fens and the south-east.

Live Stock.—Horses. With the increase in motor transport and the mechanization of farming, horses are rapidly decreasing in numbers. During the Second World War Britain became the most highly mechanized farming country in the world but farm horses decreased to less than a million and now number only about a quarter of a million.

Sheep. England has long been famous for wool of excellent quality—so excellent that there was still, until very recently, a small export for special purposes to the United States—and sheep number about 15,000,000 in England and Wales; 10,000,000 in Scotland (1953); and 4,000,000 in Ireland. There is a somewhat remarkable specialization, and distinct breeds tend to be strictly localized. The famous Lincoln and Leicester breeds are localized to a considerable extent in those counties; the Southdown on the chalk downs of the southern counties; the Romney Marsh on that damp flat stretch in southern Kent. The chalk downs afford some of the finest pasture in the country; the sheep which are bred on the rough hill pastures of Wales and Scotland tend to be inferior in the quality and yield of both wool and, sometimes, mutton. It is, however, dangerous to generalize too far, since "heather fed" Scottish mutton has a very high reputation.

Cattle. There are 8,000,000 cattle in England and Wales; 1,600,000 in Scotland; and over 5,000,000 in Ireland. It will be noted that in Ireland cattle outnumber sheep, for the damp pastures of that island are pre-eminently suited to cattle rather than sheep. Broadly speaking, half the cattle in the British Isles are classed as "beef cattle," half as "dairy cattle." In Great Britain the dairying industry is directed in the first instance to supplying the huge demand for milk—a very valuable food—and, secondly, for butter and cheese. Formerly the seats of the dairying industry were dictated by the existence of suitable rich, damp pastures; latterly the prime factor is one of markets and marketing arrangements—hence

the now very important dairying industry in the dry eastern county of Essex near the great metropolitan area of consumption.

Pigs. Although there are more than 4 million pigs in Great Britain and $1\frac{1}{2}$ million in Ireland, the bacon industry is not as prosperous as it should be, and pork and ham are of greater importance than bacon.

The influence of geographical conditions is well seen in the type of farming.

In the remoter parts of the Scottish highlands the type of farming known as *crofting* prevails. On the borders of the great moorland areas of Britain *hill-sheep farming* is the rule, on slightly better land *cattle rearing*, the young stock being sold to lowland dairy farmers and graziers. Over a very large part of lowland Britain *dairy farming* predominates, with an emphasis on milk for the towns. On rich pastures as in Leicestershire the *fattening* of animals for the butcher is important. In the wetter lands of western England and Wales *mixed farms*, run by the farmer and his family, produce a range of crops and livestock. It is mainly in the drier east that *arable farms* produce crops for sale. Where physical and economic conditions are favourable such specialized types of farming as *fruit* and *vegetables* (market gardening) are found.

Fisheries. The fisheries of the United Kingdom employ about 40,000 men—or in all give employment to double that number. The annual catch is about a million tons, but a considerable proportion of this is from distant waters. Cod comprise 40 per cent. of the catch, herring 15–20 per cent. and haddock 12 per cent. A large proportion of the whole catch is exported. By far the richest fishing grounds are in the North Sea, so that the leading fishing ports—Grimsby, Aberdeen, Hull, Yarmouth, and Lowestoft—are all on the east coast. The pilchard fisheries were formerly important off the south-western peninsula; there is a considerable amount of fishing in the Irish Sea (port: Fleetwood). Oysters are important at Whitstable in Kent and at Colchester on the Essex coast.

Population. At the census of 1951 over 80 per cent. of the total population of England and Wales (43,745,000 people) were classed as “urban,” leaving less than 20 per cent. rural. The latter percentage is steadily decreasing. In England and Wales there are more towns having populations exceeding 100,000 than in India, with its total population of 450,000,000. In Great Britain only about 7 per cent. of the population are farmers; by far the greater number are concerned with manufacturing industries, commerce, and transport service.

Two hundred years ago when agriculture was the leading occupation, the only thickly populated counties of England and Wales were the agricultural lands of the south-east and Midlands. With the coming of the Industrial Revolution the coalfields became the

areas of densest population, and to a large extent have remained so up to the present day. It is sometimes difficult to get from the census of Britain a proper idea of the size of towns because of the use of administrative divisions: thus the city of Manchester had a population in 1951 of 703,000, but the county borough of Salford

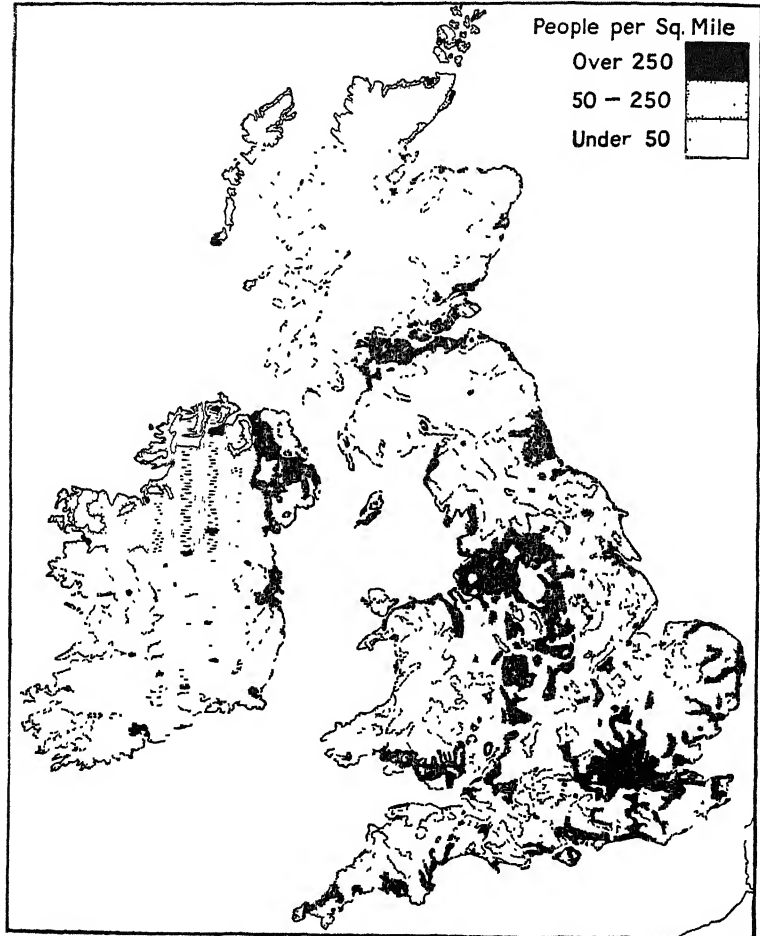


FIG. 295.—The population of the British Isles.

The three divisions correspond roughly with industrial, good agricultural and poor agricultural.

is really an integral portion of the same thickly populated area, and its population ought really to be included with that of Manchester. Hence it is better to consider for England the population of what are known as conurbations, a group of urban areas which are situated close together. The leading conurbations which ought

to be studied from the geographical standpoint are Glasgow and Clydeside, Liverpool and Birkenhead, Manchester, Leeds-Bradford, Newcastle and Tyneside, Birmingham, Swansea, Cardiff, Hull, and London. The first six, and of course London, have each over a million people. The concentration of most of these great urban areas on or near the coalfields needs no comment, but with the increasing use of electric power there is now a marked tendency to decentralization. Many industrial centres are no longer situated on the coalfields, and in particular there is a marked increase in the industrial region of the south of England.

Manufactures. Two features are characteristic of the distribution of manufacturing industries in the British Isles. One is the marked coincidence of the great industrial areas with the coalfields, and the other is the marked specialization of individual areas. The first point will be made clear by comparing Figs. 286 and 296. It is true that the increased use of electricity, in particular, is promoting decentralization, but the change is only beginning to be widely manifest and is marked by the increasing importance of factory industries in the south-east. The second point is illustrated very roughly in Figs. 296 and 298.

Textiles. The products of the various textile industries for long made up nearly 40 per cent. of the total value of British exports of home origin (1909-13, and 1924). Their relative importance has, however, been steadily declining and by 1952 had fallen to 13 per cent. of total exports. Nevertheless the textile industries remain of great importance, new fibres like nylon replacing the old.

The *cotton industry* is markedly localized in Britain; the spinning and weaving of cotton are almost restricted to the west side of the Pennines, mainly to that part of Lancashire which lies south of the Ribble, and in Scotland to Glasgow and other manufacturing towns of the west. The damper atmosphere west of the Pennines was once a factor in this localization. Manchester (with Salford) is the great business centre; Oldham and Bolton are great spinning towns, whilst Burnley, Blackburn, Preston, Bury, and Rochdale are weaving towns. For its supplies of raw cotton Lancashire is still mainly dependent on Liverpool, but supplies come also direct to Manchester by the Ship Canal.

The *woollen industry* is centred in the West Riding of Yorkshire especially around Leeds which is the business centre and Bradford. The narrow valleys to the west of Leeds are filled with larger or smaller manufacturing towns engaged in the industry, for the most part established in the Middle Ages when suitable water for scouring, supplies of fine, lustrous wool from the neighbouring moorland pastures, and the low cost of living, were the great advantages offered by these locations. Bradford is the great worsted centre; other towns engaged in various branches of the woollen industry

are Halifax, Huddersfield, Dewsbury, Wakefield, and Barnsley, with hosiery and knitwear in the Midland towns such as Nottingham and Leicester. In Scotland several towns in the basin of the Tweed are famous for the fabrics known as "tweeds." Other woollen manufactures are carried on in towns of the coalfield regions. In Ireland woollen manufacturing is largely limited to Belfast which has long been the centre of the *linen industry*.

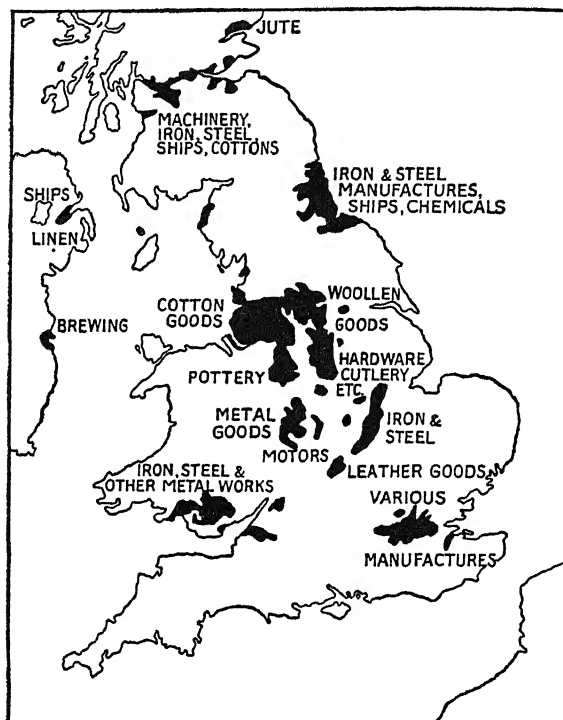


FIG. 296.—The industrial regions of Great Britain.

Notice that they are nearly all situated on coalfields.

The *silk industry* is pursued mainly in Derbyshire and the neighbouring parts of Staffordshire and Cheshire, at Derby, Ilkeston, Chesterfield, Macclesfield, Congleton, and Leek. The output of silk goods is now less than that of artificial silks or rayons and nylon, and in view of the fact that many cotton and woollen firms now manufacture rayon and other artificial fibre fabrics, it is widely distributed.

Jute fabrics are manufactured mainly at Dundee.

Iron and Steel. Iron and steel and their products including the products of engineering make up about half of British exports of

home origin. The chief seats of iron-smelting are at and around Middlesbrough (N. Yorkshire) and South Durham; in South Wales, including Newport; in North Lancashire and Cumberland (Barrow, etc.); and on the Midland iron fields including the new towns of Scunthorpe and Corby. In connection with the manufacture of

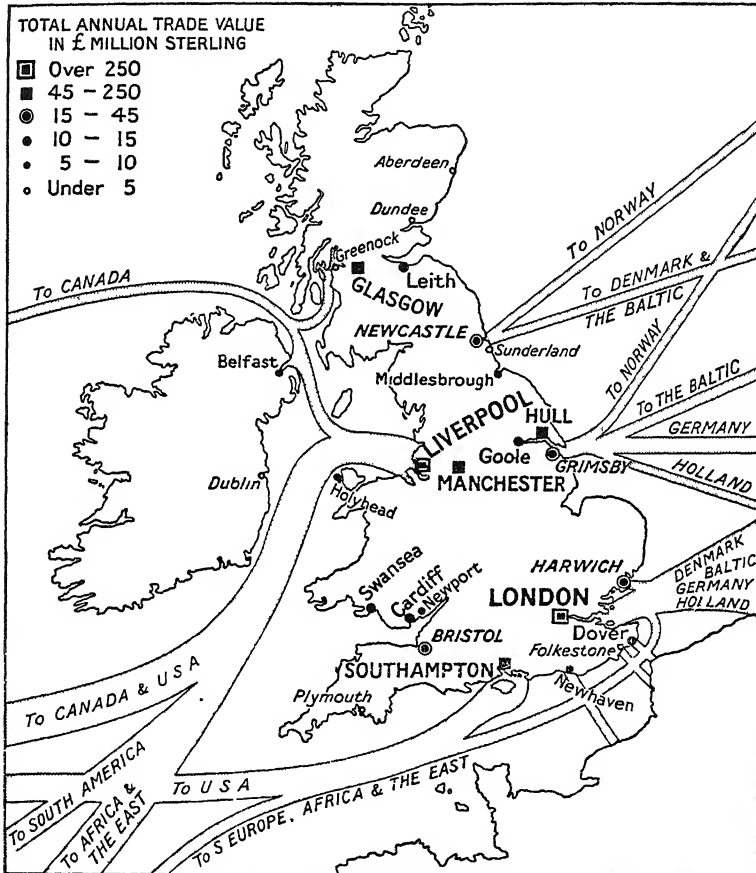


FIG. 297.—The ports of the British Isles.

Notice the favourable position of London, opposite the continent of Europe.

articles made from iron, two towns in England are especially noteworthy—Birmingham and Sheffield (each with the surrounding district). Shipbuilding is associated with the iron and steel industry especially in the Clyde area, the chief seat of shipbuilding in all its branches in the world; along the Tyne, Wear, Tees, and at Belfast. Railway rolling stock is manufactured at works the location of which was largely determined by the requirements of the railway companies

concerned—at Crewe, Swindon, etc. The motor-car industry is especially important at Coventry, Birmingham, and Oxford. The tin plate industry is centred at Swansea in the South Wales coalfield.

Other Industries. The making of earthenware and porcelain is associated with the “Pottery towns” united at Stoke-on-Trent on the North Staffordshire coalfield. Alkalis, chemicals, and glassware are important in Cheshire (associated with salt deposits) and South Lancashire (St. Helens, Warrington, Widnes, etc.), and Tyneside, but the great modern development of the chemical industry is to the north of the mouth of the Tees. The leather industries with

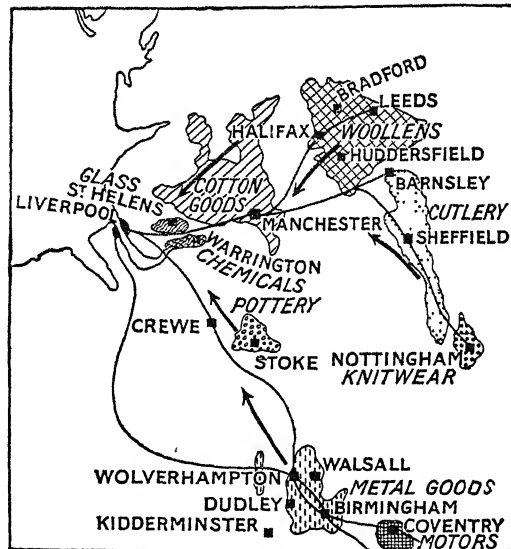


FIG. 298.—The products of the hinterland of Liverpool.

boot and shoe making are important at Northampton, Leicester, Stafford, and other Midland towns. Paper is manufactured especially where conditions are suitable for the receipt of the bulky raw material and where there are adequate supplies of water. North Kent and the Thames estuary have become leading areas for news-print.

Communications. Inland waterways, if we except the very important Manchester Ship Canal, are relatively unimportant in the British Isles, and only carry about $\frac{1}{20}$ th of the traffic handled by the railways. Great Britain has about 20,000 miles of railways, grouped in 1923 into four systems—the London, Midland and Scottish, London and North Eastern, Great Western, and Southern. The railways were nationalized in 1948 as British Railways, organized

in six regions. It is impossible here to give details of the railways; they should be studied in relation to their direction from the great focus, London, and to the great ports which they serve. The increased efficiency of motor transport and the close network of roads in the British Isles have led, in the last few years, to greatly extended use of the roads both for passenger and goods traffic.

Ports. Fig. 297 has been drawn to show the principal ports of the British Isles. It indicates at once the overwhelming importance of London and Liverpool handling together about 60 per cent. of the total foreign trade. The next in order are Manchester, Hull, Southampton, and Glasgow.

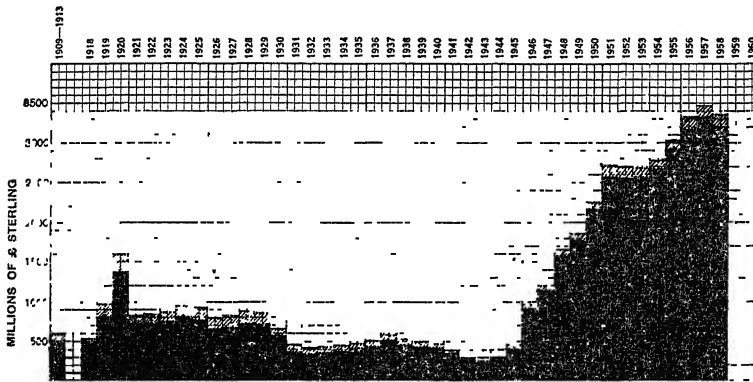


FIG. 299.—The exports of the United Kingdom.

Exports of domestic origin in black, exports of Colonial and foreign origin shaded.

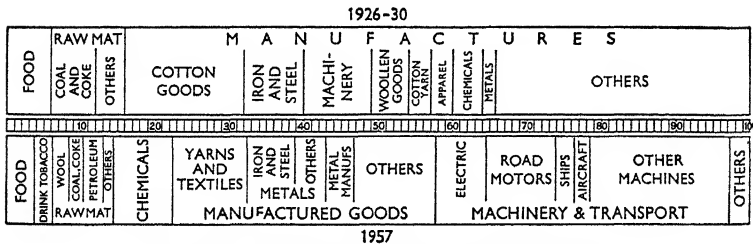


FIG. 300.—The exports of the United Kingdom.

London receives between 30 and 40 per cent. of the imports, deals with over 30 per cent. of the exports, and handles no less than half the entrepôt trade which is so characteristic of Great Britain. Its situation at the head of ocean navigation of a river which allows access a considerable distance into the interior, nearly opposite the greatest of continental rivers, the Rhine, no doubt determined its early growth and hence indirectly made it the capital of the country,

a position which favoured its further increase. The whole port, from the tidal limit at Teddington to the mouth between the Isle of Sheppey and Essex, is under the control of the Port of London Authority.

Liverpool has risen to high rank only within the last 200 years. Figs. 296 and 298 illustrate the industrial regions situated in its hinterland, regions which are connected with port by rail. The Manchester Ship Canal has not taken trade away from Liverpool but has accentuated the importance of the Lancashire-Cheshire industrial region as a whole.

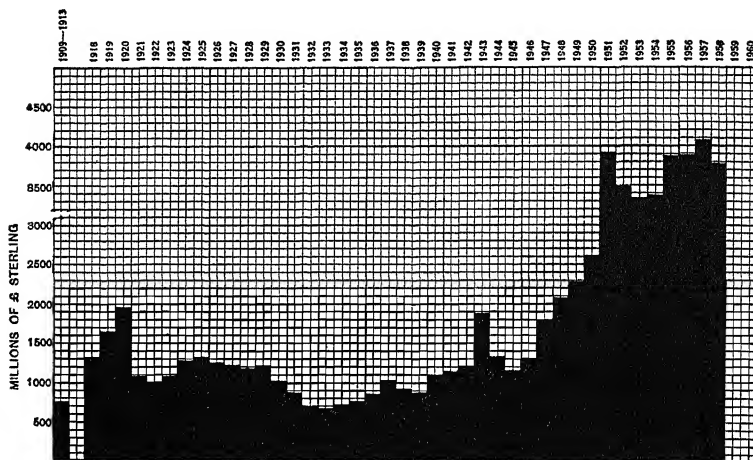


FIG. 301.—The imports of the United Kingdom.

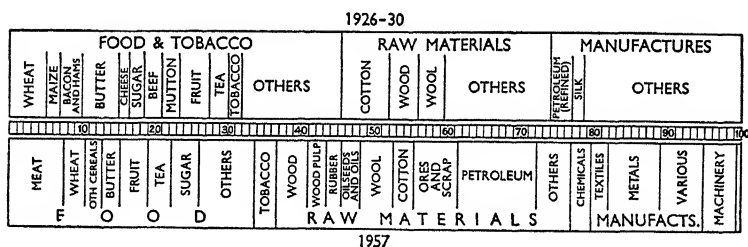


FIG. 302.—The imports of the United Kingdom.

Hull is another of the older ports of England. *Southampton* on the other hand is a modern creation as a great port. *Glasgow* is an old port but owes its modern growth to the dredging of the Clyde.

Most of the ports have a foreign trade which is localized and determined by the regular steamship lines which serve them. Some attempt has been made to indicate this in Fig. 297.

Foreign Trade. One of the most striking features of British foreign trade is the excess of the value of the imports over the exports. The "invisible" exports which pay for the excess include receipts from overseas investments (about one-half the total), receipts from shipping (about one-third), and others. It was the sale of overseas investments to pay for the Second World War which made Britain's position in foreign trade so difficult—there was a great drop in "invisible" exports. Another striking feature is the large entrepôt trade (though less than formerly); a third, the high place taken by foodstuffs among the imports. The diagrams should be studied with the greatest care.

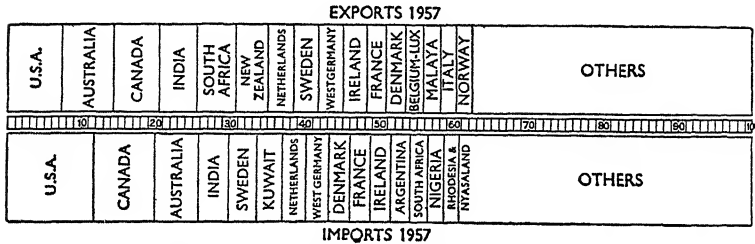


FIG. 303.—The direction of the foreign trade of the United Kingdom.

THE NATURAL REGIONS OF THE BRITISH ISLES¹

The North-West Highlands of Scotland. The mainland of the north of Scotland may be described as the wildest and most desolate in Britain, consisting mainly of rocky mountains and heather-covered moorland and bogs. The population consists chiefly of fishermen round the coasts, but much attention is now being paid to the development of water power. The Inner Hebrides are also very mountainous and famed for their fine scenery. The Outer Hebrides are populated mainly by shepherds—the making of "Harris Tweeds" is a cottage industry—and fishermen. The Orkneys have some quite extensive areas of a fertile red soil, and considerable areas are cultivated, oats, barley, hay, and potatoes being grown. Shetland is famed for its shaggy little ponies, and there are many sheep and cattle in the islands. The catching and curing of fish, especially herrings, is important. The fertile red soil of the Orkneys is found also on the east coast of the mainland along the shore of Moray Firth. The lower rainfall and sunny climate encourage arable farming.

The South-East Highlands. As already noted, the south-east Highlands, or Grampians, are separated from the north-west Highlands by Glen More (through which runs the Caledonian Canal used

¹ Space prevents this section from being adequately illustrated, and the section itself must be regarded simply as a summary. A fuller treatment will be found in *The British Isles* (Longmans), and *A Regional Geography*, Part V.

by small steamers) and extend southwards as far as the Highland Boundary Fault. The whole area is a much-dissected plateau, with a general N.E. to S.W. trend of the valleys. The Highland glens are usually wooded; the hills clothed with bracken, heather, and coarse grass. The moors afford summer pasture to numerous sheep (the wool is woven into plaids, blankets, etc.); a few cattle are kept and a little agriculture carried on in some of the valleys. The fiorded, drowned western coast of the Highlands offers a marked contrast to the eastern coast. Here, sheltered from the Westerlies by the Grampians, is a coastal plain with stretches of fertile soil and a drier, sunnier climate suited to agriculture and cattle-rearing. Here lie the fishing ports of Aberdeen, Peterhead, and Stonehaven, the first two also exporting granite.

The Midland Valley. The rift valley which lies between the two great boundary faults is by no means a flat area. The fertile lowlands are broken by numerous hills marking the outcrops of volcanic rock. The Midland Valley is drained by the Clyde and Ayr flowing westwards; the Forth and the Tay flowing from the Grampians eastwards. The Clyde is navigable by large ocean steamers to Glasgow and is linked by canal with Grangemouth on the Forth. The richest agricultural land in the Midland Valley lies in the east—especially in Strathmore¹ around Perth, and in the Forth valley around Stirling. But the industrial areas are centred on the four coalfields of Ayrshire, Lanarkshire, Midlothian, and Fifeshire. On the Ayrshire field the main centres are Ardrossan and Kilmarnock, but associated with the Lanarkshire field is the great industrial region of the Clyde estuary. The iron-smelting of Motherwell, Wishaw, Coatbridge, and Falkirk no longer depends primarily on local supplies of ore but on imported ore, especially from Sweden. Shipbuilding yards line the Clyde on both banks below Glasgow—to Greenock on the south and Dumbarton on the north. The damp climate, as in Lancashire, favours cotton-spinning at Glasgow and Paisley, the latter town specializing in cotton thread. In addition a great variety of domestic articles is manufactured at Glasgow.

On the Midlothian field, Edinburgh, with its port, Leith, is the chief centre, and numbers paper-making, printing, and brewing amongst its industries. On the Fifeshire field, Kirkcaldy is the chief centre.

In the east of the Midland Valley, outside the coalfield regions, lie the old university town of St. Andrews and the town of Dundee. Supplies of fruit from the fertile Carse of Gowrie in the shelter of the Sidlaw Hills have led to the jam-making industry of Dundee; the demand for sailcloth, ropes, and fishing nets, along the coast led to the flax and hemp industries, and later to the jute industry.

¹ A "strath" is a broad river valley; Strathmore is in part the valley of the Tay.

The Southern Uplands. The old rocks of the Southern Uplands afford but a poor soil and the region is clothed mainly with rough hill pastures. The population consists chiefly of scattered sheep farmers. Bordering the Solway Firth and the south coast are fertile plains largely devoted to dairy-farming. In the east lies the fertile valley of the Tweed. The dry pastures of the surrounding hills support sheep with a high quality wool, and hence the old-established woollen industry of Hawick, Jedburgh, Galashiels, and other towns. Lead is found in the Lead Hills.

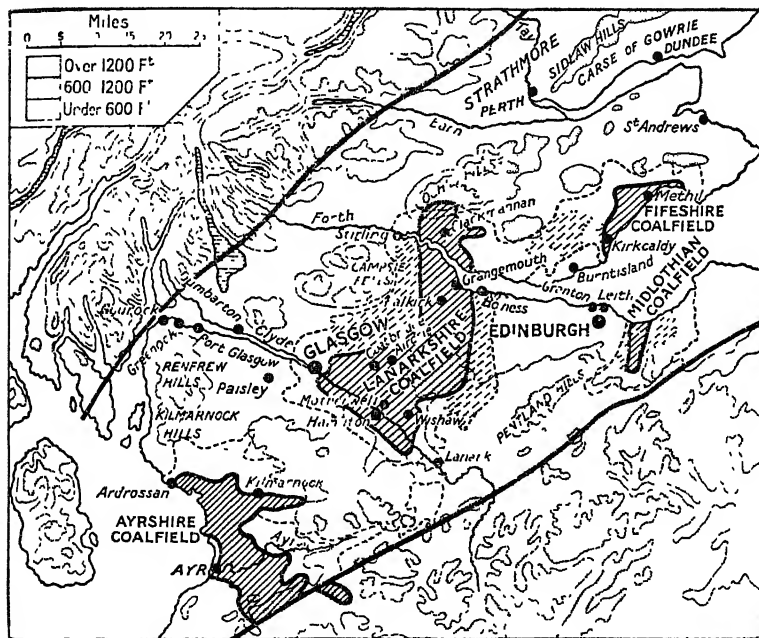


FIG. 304.—The Midland Valley of Scotland.

The main parts of the coalfields (coals of same age as those of England) are enclosed within the heavy lines.

The Lake District. The mountains and valleys of the beautiful Cumbrian massif have a radial arrangement, and the old rocks are wrapped round by younger on all sides. The heart of the massif, with Derwent Water, Grasmere, Windermere, and Ullswater is a favourite holiday resort, and Keswick, Grasmere, and Ambleside may best be described as "hotel-towns." To the north-west of the old massif lies the Cumberland coalfield, with Whitehaven, Workington, and Maryport; to the north-east lies the fertile valley of the Eden, with Penrith and Carlisle; to the south-west lies the iron-smelting and shipbuilding district around Barrow.

Geographically the Isle of Man has much in common with the Lake District and serves likewise as a holiday resort for Lancashire.

Wales. Nearly the whole of Wales is hilly or mountainous, but there is a broad distinction between the complex of old rocks which makes up North and Central Wales and the coalfield region of South Wales. Between the two, on the east, is a wedge of Old Red Sandstone country, partly very fertile, but also forming the desolate moorland stretch of Brecon Beacons. North and Central Wales form a broad stretch of moorland country, with sheep-farming as the chief occupation and the population concentrated in the more fertile valleys. Holiday resorts, such as Llandudno, Rhyl, Colwyn Bay, are noteworthy along the coasts as well as inland (Dolgelly, Bala, etc.). Roofing slate is quarried at Festiniog and other localities in Carnarvonshire. On the eastward flanks of North Wales lie the Flintshire and Denbighshire coalfields. The South Wales coalfield, continued westward as the Pembrokeshire coalfield, is unique in several ways amongst British coalfields. In the first place, the household coals of the east give place westwards to steam coals and then to anthracite. In the second place, the coal seams occur at two horizons separated by a thick mass of barren sandstone known as the Pennant Grit. The latter gives rise to great stretches of barren moorland, and the colliery towns are drawn out along the narrow valleys—generally with a trend from north-north-west to south-south-east—which lie amongst the moorland. The great outlets of the coalfield are Newport, Cardiff, and Swansea. Quantities of coal are exported especially to the great coaling stations of the world, though nothing like so much as before the two World Wars. Cardiff and Newport have developed iron-smelting and shipbuilding industries. Modern steel mills have been developed at Ebbw Vale and, since the Second World War, near Port Talbot. Swansea (with Llanelly and Neath) is the centre of the great tin-plate industry and is also a copper-smelting centre. The tin, formerly from Cornwall, is now imported from Malaya, Bolivia, and Nigeria, and much iron from Northern Spain.

Devon and Cornwall. The south-western peninsula, although another massif of old rocks, differs greatly from the Lake District or North Wales. The interior is not rugged but consists of a plateau rising gently to the granite moors which occur at intervals from Land's End to Dartmoor. The tin and copper deposits are associated with the fringe of the granite masses of Land's End and Redruth-Camborne; the china clay with the granite mass near St. Austell. The population of the south-western peninsula is concentrated in the coastal towns and villages; except for the valleys of Devonshire much of the interior is bare and depressing and contrasts strangely with the magnificent coast scenery. The warm equable Scilly Isles and the sheltered southern valleys around

Penzance and Plymouth have a considerable trade in supplying cut flowers and early vegetables for the London market.

The North of England. Under this title it is convenient to consider the broad Pennine uplands—treeless moorland but sparsely populated—and the busy industrial coalfield regions by which they are flanked. The uplands consist of vast stretches of Carboniferous Limestone or Millstone Grit affording dry sheep pastures, and now important as gathering grounds for the water supply of the great towns. The limestone scenery is especially fine in Derbyshire, where steep-sided wooded valleys lend variety to the countryside. Special importance attaches to certain of the passes through the Pennines, notably the Aire Gap and the Calder Gap, which afford communication between Lancashire and Yorkshire.

The Northumberland and Durham Coalfield is associated essentially with iron-smelting and ship-building. In addition to the iron-smelting in the Tyneside towns, coal is also supplied to the Middlesbrough area. The Tyne is navigable by large vessels to Newcastle, but the Wear only at its mouth, hence the concentration of ship-building at the Tyneside towns from North and South Shields to Elswick and at Sunderland. The proximity of the coalfield to the salt mines at the mouth of the Tees has given rise to the chemical works of Tyneside. The chief coal-exporting ports are Newcastle, Wallsend, Tyne Dock, South Shields, Sunderland, and Hartlepool. The university and cathedral town of Durham, and Darlington with its railway works, should be noted.

The Lancashire Coalfield is associated essentially with the cotton industry of which details have already been given. Engineering works have arisen for the purpose of supplying the cotton-mills with machinery. Wigan is the chief coalfield town. Along the banks of the Mersey are numerous towns engaged in chemical industries and glass-making.

The Yorkshire Coalfield is associated essentially with the woollen industry and, farther south, with a variety of iron and steel manufactures, of which the cutlery of Sheffield is most famous. The Yorkshire field continues into Nottinghamshire and Derbyshire, and at the southern end lies Nottingham, with its lace, hosiery, and leather industries.

The Midland Coalfields of North Staffordshire, South Staffordshire, Warwickshire, and Leicestershire are each associated with industrial development. *North Staffordshire* is the pottery region—using local clays and fireclays as well as china clay from Cornwall. The *South Staffordshire Coalfield* supplies the fuel of the famous “Black Country,” of which Birmingham is the centre, and which manufactures a great variety of hardware or small iron goods. There is marked specialization amongst the various towns—Dudley in screws, Wednesbury in nails, Redditch in needles, Wolverhampton

in cycles, etc.; Birmingham has a greater variety, including electro-plated goods, brass ware, and cheap jewellery. The principal centres of the *Warwickshire* field are Nuneaton and Tamworth, but the manufacturing town of Coventry, with its machinery, motor and cycle factories, lies just to the south. The *Leicestershire* field has no great manufacturing town, but near by is Leicester, with its woollen, hosiery, lace, and leather industries. Although they lie scattered amongst and largely covered by the agricultural lands of the great midland plain, we may here note to the west of the South Staffordshire field the coalfields of Shropshire with the old-established iron industry of Ironbridge, and the Wyre Forest field with the important linen, woollen, and carpet-manufacturing centre of Kidderminster.

The Midland Plain. A great part of the heart of England is occupied by rocks of Old Red Sandstone, Permian, and especially of Triassic age, which weather to fine rich red soils suited especially to permanent pasture and hence to dairy-farming. Cheshire in particular is a highly developed cattle and mixed farming county; barley, oats, and wheat are widely grown over much of the Midlands. The Vale of Evesham is renowned for fruit and vegetables. Herefordshire also is famous as a fruit and hop county, and in this respect is linked with the stretches of similar soil in Somerset. It has already been mentioned that some small coalfields lie amidst the Midland Plain; in the south-west are others—the Forest of Dean, Bristol, and Somerset fields. Most of the towns in the Midland Plain have been, and often are still, market towns serving the needs of the neighbourhood. It is not difficult to see how such industries as the leather industry of Northampton have been fostered by local supplies of raw material. Special mention must be made of the old port and industrial area of Bristol and district; associated since early days with the West Indian and American trade, and to this day connected with sugar, tobacco, cocoa, and chocolate.

The Scarplands of South-Eastern England. Although including in its midst the great Metropolis of London, the south-east of England is pre-eminently the agricultural region of Britain. The region as a whole may be said to be bounded on the north-west by the scarp formed by the lowest Jurassic limestone—not always geologically of the same age—which overlooks the Midland plain. The Jurassic limestones give rise to one, two, or three ridges each with a steep scarp face westwards and a gentle dip-slope eastwards. The dip-slope passes into a “clay vale” bounded by another scarp face. Passing Londonwards the best-marked escarpment of all is made by the chalk which lies above all the Jurassic beds. It forms Salisbury Plain, the Chiltern Hills, the East Anglian Heights, the Lincolnshire Wolds, and Yorkshire Wolds. In the counties of Surrey, Kent, and Sussex the beds have been folded upwards into

an elongated dome and the chalk cover removed from the centre, thus giving rise to the well-known Weald. North of the wealden uplift lies the Thames Basin filled with later rocks—mostly soft

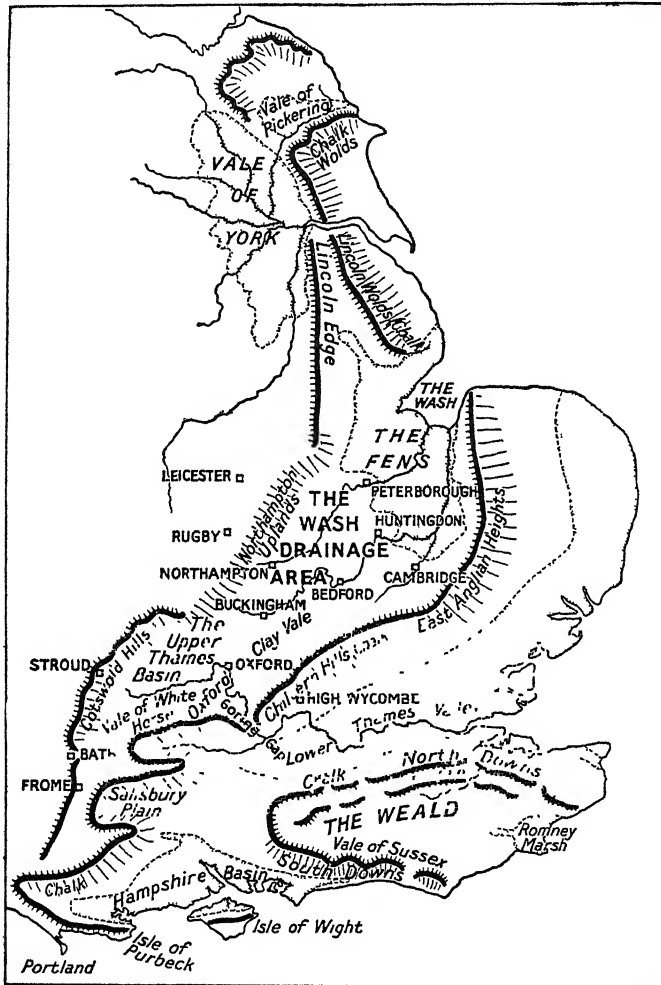


FIG. 305.—The scarplands of South-Eastern England.
The main areas of alluvium and the two great Tertiary basins are dotted.

clays and sands—to the south-west of the Weald is the Hampshire Basin. Certain broad stretches of alluvium interrupt the succession of limestone ridges and clay vales—notably the large area of the Vale of York centring at York itself; the Fenlands around the

Wash and Romney Marsh in Kent. Broadly speaking, the limestone ridges afford sheep pastures; the clay vales agricultural and cattle country. It is in this part of England that one sees the "close," rich country of small fields separated by hedgerows and cut up by scattered fragments of woodland, which is so essentially "English." Nearly all the towns one might mention have served their purpose as market towns for the country around. Certain industries which started as cottage industries have survived—such as the "broadcloth" of Stroud, Bath, Frome, etc., using wool from the neighbouring Cotswolds; whilst it is not difficult to see the reason for the manufacture of farm implements at Norwich.

The phenomenon which is London is gradually affecting the greater part of south-east England. High rentals and high rates are encouraging decentralization and the consequent industrialization of such surrounding towns as Slough, Reading, Oxford, Swindon, Southampton, the Medway Valley towns, Colchester, and Ipswich. The ports of Southampton, Newhaven, Folkestone, Dover, and Harwich are mainly outports of London; much of the prosperity of Bournemouth, the Isle of Wight, Worthing, Brighton, Eastbourne, Ramsgate, Margate, and Southend depend upon their use as holiday resorts by Londoners.

The hidden coalfield of East Kent, now being developed, may result in great changes in what is at present a quiet rural district.

The **Channel Islands**, including Jersey, Guernsey, Alderney, and Sark, are administered according to their own laws and are not bound by the Acts of the British Parliament unless specially named in them. Half the arable land is under potatoes, and the islands supply Great Britain with tomatoes, early potatoes, grapes, fresh flowers, and granite. The islands are favourite holiday resorts.

NORTHERN IRELAND

Northern Ireland includes six counties of the old province of Ulster—Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone. The area is 3,350,000 acres and the population (1951) 1,371,000; hence it is more densely populated than the Irish Republic. The great Antrim plateau is formed of sheets of basalt (the columnar basalt at Giant's Causeway is world famous) whilst the Mourne Mountains are of granite. The most important parts of Northern Ireland are the broad fertile valleys of the Lagan, Bann, and Foyle, where oats and flax are leading crops. Belfast is the capital and largest town, and carries on ship-building (using imported steel), flax-spinning, linen-weaving, cotton-weaving, and distilling. Londonderry (Derry) is also a textile town. Much of the linen export goes outside the United Kingdom.

THE IRISH REPUBLIC (EIRE)

The Irish Free State was constituted in 1922 as a self-governing dominion. In 1937 it adopted the official name of Eire (Ireland) and became a republic, later styled officially the Irish Republic. It includes twenty-six of the thirty-two counties of Ireland and has an area, excluding large rivers and lakes, of over 17,000,000 acres, with a population in 1951 of nearly 3,000,000. The density is thus low. It has already been pointed out that Ireland, with a damper climate, is more suited to dairying than arable farming. In 1952 the imports exceeded £172 mn. (51 per cent. from the United Kingdom) and the exports £99 mn. (over 87 per cent. to the United Kingdom). The leading imports are cereals, coal, petroleum, iron and steel, machinery and textiles; the exports, live cattle, and other livestock; fresh and canned meat, bacon, butter and eggs, and beer. The bulk of the trade is through the port of Dublin.

The Central Plain of Ireland is a great limestone plain covered with impervious clays of glacial origin, so that bogs cover very large areas; where bogs are absent the soil is fertile. The farmers' holdings are generally small—more than half are under fifteen acres. The export of live cattle and dairy produce is mainly from the Central plain. The Shannon is the largest river in the British Isles and by circumventing the rapid below Lough Derg by a canal it is navigable to Lough Allen. A great hydro-electric scheme utilizes the fall of the Shannon to generate electricity for nearly the whole country. The rim of highlands which in general surrounds the Central Plain is breached in the east, so that Dublin is the natural outlet of the plain, sharing some of the trade with Dundalk and Drogheda. Limerick is the outlet of the Lower Shannon, and lies in the midst of very fertile land.

The Connemara Highlands and Donegal in the north-west of the country have a poor thin soil, an excessive rainfall, and are swept by strong winds from the Atlantic. The small population exists in the valleys or by fishing along the coasts.

South-Western Ireland is built up of a series of mountain ridges with an east-north-east—west-south-west trend. In the west the sea has invaded the valleys as long, narrow rias, which form good fishing grounds. The climate of this part of Ireland is very mild, the valleys with their dairy farms constitute some of the most fertile parts of the country, and the beautiful scenery, especially the Lakes of Killarney, attracts many visitors. Cork has one of the finest harbours in the world and Cobh (Queenstown), on an island in the harbour, is a port of call for Atlantic liners.

South-Eastern Ireland is an upland region with a mass of granite forming the lofty Wicklow Mountains. The valleys are fertile, and arable farming is of considerable importance. The fine harbour

of Waterford lies in this region; Rosslare is a packet station served by steamers from Fishguard.

SCANDINAVIA

Norway and Sweden, which were indeed under one king from 1814 to 1905, may be suitably treated together, since they both occupy the Scandinavian peninsula and have many features in common. The greater part of the peninsula is made up of a high tableland of ancient metamorphic rocks, comparable in age and general character with those of the highlands of Scotland. There are, indeed, many points of resemblance between Scandinavia and Scotland: the fiorded and island-fringed western coasts, and the location of the principal tracts of lowland in the south and east. The Scandinavian plateau is deeply furrowed by narrow river valleys; it is on the whole higher in the south (over 3,000 feet) dropping to about 1,000 feet in the north. Norway occupies the rather narrow strip between the water parting and the ocean, Sweden the area to the east and south. Hence the total area under crops and grass in Norway, notwithstanding the more favourable climate, is only 4 per cent. of the surface against 12 per cent. or more in Sweden.

Although of little use for navigation, the rivers have become increasingly important in recent years as sources of water power. In Norway 2,000,000 kW. are installed; in Sweden over 4,000,000 kW.

NORWAY

Norway has an area of about 125,000 square miles and a population of 3,330,000. The only lands which can be used for cultivation are around Oslo, at the heads of some of the fiords, some narrow valleys, especially the Glommen Valley, and isolated tracts perched high on hillsides. Nevertheless agriculture is the leading occupation; potatoes, oats, barley, and hay are the chief crops, and there are 1,250,000 cattle and 2,000,000 sheep and goats in the country. But the wealth of the country comes from the forests and the fisheries. Forests cover 24 per cent. of the country, and forest products represent a quarter to a third of the exports of the country. Fish and fish products represent another quarter or third of the exports, the principal fisheries being for cod, herrings, "brisling" (sardines), and mackerel. Whaling is still carried on extensively by Norwegians both in Northern Seas and in the Antarctic. Norway has extensive mineral deposits, but owing to difficulties of transport in such a mountainous country and absence of coal for smelting, they have been less exploited than in Sweden. The chief minerals are pyrites and iron ore, some of the latter is smelted electrically, and the large output of aluminium from Norway is the

result of hydro-electric power. Norway's hydro-electric power is used chiefly in the production of pulp and paper and in the production of electro-metallurgical and electro-chemical products. Among the latter the artificial fertilisers, ammonium nitrate, calcium nitrate, and sodium nitrate, as well as calcium carbide, should be noted.

The pressure on the land has acted in Norway as an incentive to exploration and emigration. The Norwegians undoubtedly knew North America long before that continent was rediscovered by Columbus; Norwegians have settled in every new land, and Norway still has a large merchant navy.

Oslo (formerly called *Christiania*) is the capital and largest town, exporting timber, wood-pulp, etc. *Bergen*, on the west coast, exports timber, and is a centre of fishing industries. Near by is the fishing port of *Stavanger*. *Trondheim*, farther north, is the third port, and is connected with Oslo by a railway through the Glommen Valley. Railway construction in a mountainous country like Norway is difficult, and there are railways only in the south of the country except the line to Narvik, the winter outlet for Swedish iron ore.

To the north of Norway lie the Arctic Islands of Spitsbergen and Bear Island. These may become important owing to the occurrence of coal. They are oversea possessions of Norway.

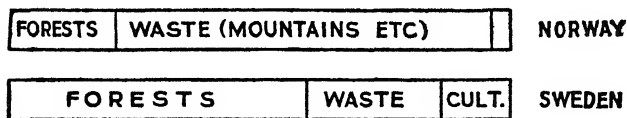


FIG. 306.—Uses to which land is put in Norway and Sweden.

Notice the very small area of cultivated land in Norway.

SWEDEN

With an area of 173,000 square miles and a population of 7,400,000, Sweden is considerably larger and more densely populated than Norway. There is far less waste land; 10 per cent. of the total surface is cultivated, and forests cover from 50 to 60 per cent. of the whole. Sweden falls at once into two main divisions, the forested north and the agricultural, lowland south.

Although Sweden has always been an agricultural country, an increasing percentage of the population—now over half—is engaged in occupations other than agriculture. The principal crops are oats, wheat, rye, and barley among cereals; potatoes and sugar-beet among root crops; but fodder crops and hay occupy as much land as all the cereals. The fodder crops are required for the 2,500,000 cattle, 250,000 sheep, and 1,800,000 pigs. But just as the wealth

of Norway comes from the forests and fisheries, so the wealth of Sweden comes from the forests and mines. Forest products represent no less than half the total exports of the country (wood-pulp, timber, pit props, paper, matches), whilst mine products, including iron ore, and iron and steel, make up about a quarter. The mining of iron is most important in the famous Gellivara district, north of the Arctic Circle, where much of the ore is exported through the Norwegian port of Narvik. Swedish ore is valued especially for its high quality. The manufacturing industries of Sweden have grown up gradually and are based primarily on the natural resources of the country, and lately on the use of hydro-electric power. Saw-mills are located all along the shores of the Gulf of Bothnia; the production of iron and steel in Central Sweden dates from a very early period in Swedish history, before the use of coal in smelting gave an impetus to countries not so richly forested. Industries of later growth include the manufacture of electrical and other machinery, paper and matches, chemicals and textiles (using imported cotton). In the agricultural regions of the south are grain and flour mills, dairies, sugar, and tobacco works and tanneries.

The southern, lowland portion of Sweden is often subdivided into three:

The Central Lowlands, with large glacial lakes and glacial soils formerly covered with deciduous forests, now largely agricultural. This region has a network of canals, connecting the lakes, as well as railways.

The Smaland Highlands, lying south of the lake region and lying between 300 and 1,000 feet above sea-level, less fertile and but partly cultivated.

The Plains of Skane in the south of the peninsula; more fertile and milder than the rest of Sweden, and hence very largely devoted to agriculture and dairying. There is an export surplus of dairy produce, mainly from this region, and most of the Swedish wheat grows here.

Stockholm is the capital of Sweden, and has iron industries. The capital is accessible by canal from *Göteborg*, the chief port of Sweden. *Malmö* is the train ferry station opposite Denmark. The port of *Narvik* in Northern Norway is connected by railway with *Gellivara*, one of the rich iron regions. The ore is carried northwards, as the North Atlantic Drift keeps the ports of Norway ice-free, while those of the enclosed, shallow and fresh Baltic freeze. *Lulea*, near the head of the Gulf of Bothnia is the summer port for the iron ores. *Norrköping* has textile works, and *Jonköping* is another industrial town. The saw-mill towns as well as *Stockholm* suffer from being ice-bound for many months of the year.

Sweden is fairly supplied with railways, and has numerous

U.S.S.R.

Position and Size. Before the First World War the Russian Empire, next in order of size to the British Empire, comprised one-seventh of all the land of the globe. After the Bolshevist Revolution of 1917 the new independent republics of Finland, Estonia, Latvia, Lithuania, and most of Poland were carved out of the fringes of Russia. But the three small republics were absorbed in 1940,



FIG. 308.—European Russia: political and general.

and large portions of Finland, Poland and Roumania added also to Soviet territory. The whole now constitutes the Union of Soviet Socialist Republics, of which the largest, or Russia proper, is the R.S.F.S.R. (Russian Soviet Federal Socialist Republic).

It forms the largest continuous political unit in the world. The growth of the old Russian Empire was quite different from that of the British Empire. Russia's growth consisted of a gradual

expansion over neighbouring lands and people, so that although the bulk of the territory is a vast plain, the Union includes within its boundaries the tundra dwellers of the far north, the hunters and lumbermen of the great forests, the nomads and later the cultivators of the steppes, and the desert camelmen of Turkistan. In the forceful words of Miss R. M. Fleming, "The Ancient Kingdoms of Georgia and Armenia, with their long tradition of Christian culture, the Moslem Central Asiatic Republics, with their age-long irrigation, civilization, and the glamour of the cities of Samarcand and Khiva and Bukhara, have been gathered

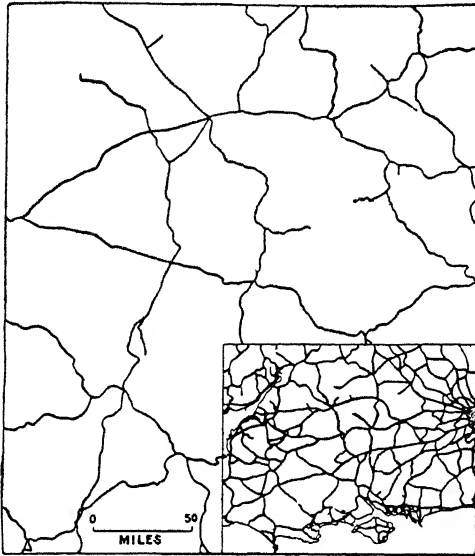


FIG. 309.—Comparative railway networks of Russia and England (inset) on the same scale.

into the same political framework as the lowly tribes of far Kamchatka. The larger part of Russian territory lies in Asia, and from remote antiquity waves of population from Asia have washed into and intermingled with waves washing out from Europe, so that Kipling's 'East is East and West is West and never the twain shall meet' emphatically does not apply to Russia."

In the still obvious intermingling of Europe and Asia, Russia stands apart from the rest of Europe. The plains of European Russia are separated from those of Asiatic Russia merely by the low rise of the Urals; the Russian people are of surprisingly varied physical type—some are purely Mongol (there are still enclaves of Tartars in the Crimea and on the lower Volga), others Slav, others even essentially Nordic. But the Slav colonization made the

Russian nation out of a multitude of materials, and therein is a parallel in Russia with the United States of America. But there is at the same time a vast difference. The area of Russia is 8·6 million square miles, and the population 210 million in 1954 (compare United States 3 million square miles, population 160 million), but whereas America has largely conquered distance, Russia has set herself the task. In the days of the old Russian Empire one part was but dimly conscious of the existence of another. The apparent railway network even of the most settled parts disappears when compared with the real network of Western Europe. The capital of one of the republics composing the Union is still 1,800 miles from a railway.

European Russia alone has an area of nearly 1 million square miles and is thus equal to one-third of the continent. Even this fragment of the whole Union stretches 2,000 miles from north to south and from far within the Arctic Circle to latitude 40° N.

Physical Features and Structure. The essential structural features of Russia have already been considered. Briefly recapitulated they are as follows:

(a) The presence of the underlying stable block of ancient rocks, the Russian platform. Although this block has been resistant to folding, it has suffered slow movement of elevation and depression, and so is largely covered with sediments which are, however, practically horizontal. The movements of elevation and depression have been fortunate for Russia, because amongst the other deposits laid down, are, in two important areas, coal seams. These two areas are the Tula Basin, south of Moscow, and the Donetz Basin.

(b) The Fennoscandian glaciers swept over much of Russia from the north-west, and so the country is largely covered with a mantle of glacial deposits. Sandy ridges alternate with marshy hollows in the forest country of the north; wind-borne dust or loess predominates in the south. It is largely as a result of the glacial deposits that Russia, though almost entirely a plain, is far from having a monotonous, flat surface.

(c) Russia includes in the south the Alpine folds of the Caucasus continued in the Crimea, as well as the low Urals already mentioned.

Minerals. The minerals of European Russia may be considered in the following groups:

- (1) The Coalfields.
- (2) The Oilfields.
- (3) The Iron Ores.
- (4) The Minerals of the Urals.
- (5) The Minerals of the Caucasus and Transcaucasia.
- (6) The Minerals of Ukraine.
- (7) Salt.

The Coalfields. The chief coalfields of European Russia, with their estimated reserves and average productions, are the following:

Field	Millions of tons			
	Reserves	Output		
		1934	1937	1950 est.
Donetz.	88,000	60	80	164
Tula or Moscow	5,930	5	10	
Ural	5,038	5.5	13	
Pechora	60,000	—	—	
Transcaucasus	189	0.2	1.4	

For the purposes of comparison the following table shows the position for the coalfields of Asiatic Russia.

Kuznetzk	400,000	11.6	20	100
Minusinsk	14,000	*	*	
Kansk	40,000	*	*	
Irkutsk	75,000	3.5	4.5	
Tunguz	400,000	*	*	
Bareinsk (Far East)	60,000	*	*	
Yakutia	60,000	*	*	
Vladivostok	3,775	3.0	6.5	
Ferghana	5,263	1.0	3	
Karaganda	20,000	1.8	7	

* Total minor areas 1934 2.0; 1937 estimate 4.5.

In 1913 the total production of coal in Russia was 29 million tons, 87 per cent. of which came from the Donetz Basin. During the Revolution coal production dropped to a very low level, but by 1928, when the First Five Year Plan was put into operation, it was a little above the 1913 level. In 1934 the production had reached 93½ million tons, and the production for 1937 scheduled under the Second Five Year Plan was 152½ million tons. The Donetz field was then providing more than half of the total output. It was completely overrun by German troops during the war. Despite this, and indicating the great development of Asiatic fields, production reached 164 million tons in 1946 and 264 in 1950. The brown coal-field of Moscow has long been seriously exploited, and yielded in 1934 5 per cent. of Russia's total. Soviet scientists claim that their country has 20 per cent. of the world's coal.

A new development has been the utilization of *peat* in the northern half of the country.

The Oilfields. Russia is third, after the United States and Venezuela, in the world production of oil—the output in 1913 of 9,200,000 tons being increased to 25,500,000 in 1934. The planned

total at the end of the Second Five Year Plan in 1937 was 47,000,000 tons, but it was not till 1952 that this figure was reached. Oil-fields occur:

(a) On both flanks of the Caucasus—on the south by far the most important area is around Baku, producing two-thirds of Russia's

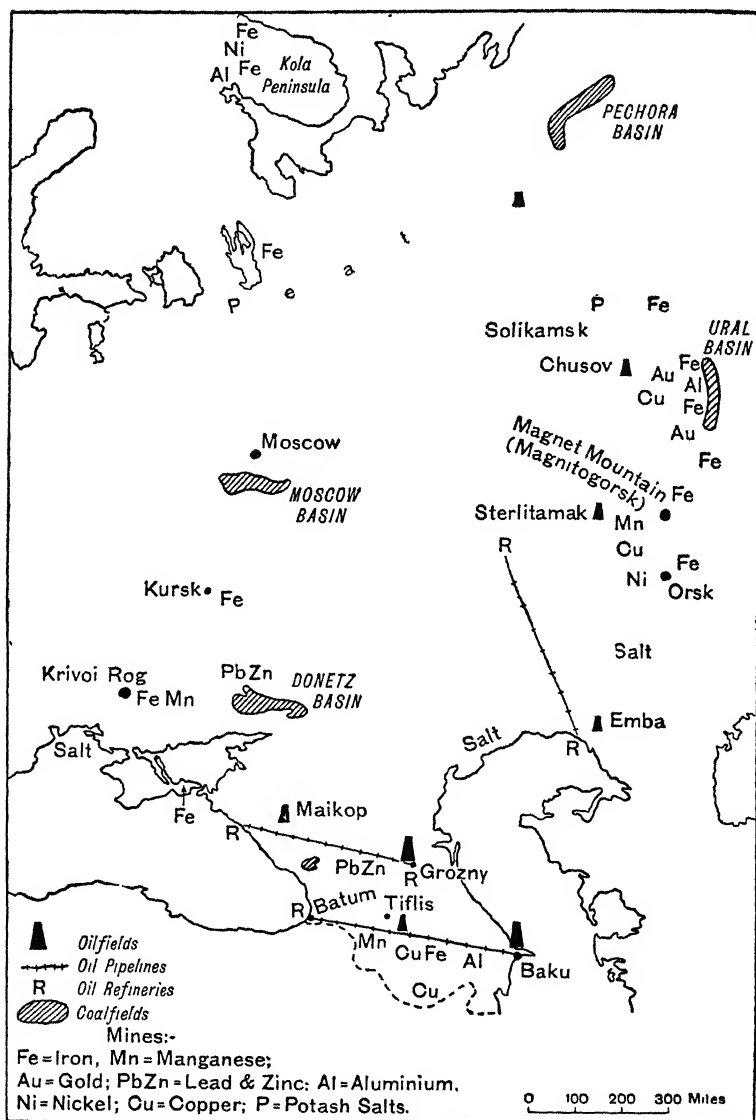


FIG. 310.—The coalfields, oilfields, and minerals of European Russia.

oil. The oil is sent by pipe-line to the Black Sea and the pre-1914 working was by British interests. Oil also occurs near Tiflis. On the north the most important area is around Grozny, other areas including Maikop.

(b) On the flanks of the Urals from the Pechora region in the Arctic north to Emba on the shores of the Caspian Sea. A chain of fields has been discovered, but they are only now being opened up.

Russia also has oil in the Asiatic territories bordering Iran as well as in Sakhalin in the Far East.

The Iron Ores. The best-known and most important iron ore field in Russia was that of Krivoi Rog in the Ukraine—now known to be part of a huge area lying west of the Donetsk coalfield. Near the southern end of the Urals is the famous Magnet Mountain, near which has grown up the great iron and steel town of Magnitogorsk, but this is only one of the important iron deposits associated with the Urals. An important one recently discovered is near Orsk. In the far north rich iron ores occur in the Kola Peninsula, whilst a huge deposit has been discovered at Kursk in the steppes of Asiatic Russia. Soviet scientists claim that the U.S.S.R. has over half the world's known resources of iron ore.

The Non-Ferrous Minerals of the Urals. Amongst the important minerals of the Urals, the ores of copper take a leading place. Nickel, gold, platinum are also important, whilst large deposits of potassium salts have been discovered in the north.

The Non-Ferrous Minerals of the Caucasus. The richness of Transcaucasia in minerals has long been known, but serious exploitation is recent. Copper is important, also manganese; lead and zinc are mined north of the Caucasus and the extraction of aluminium is carried on.

The Minerals of Ukraine and South Russia. Apart from the iron ore, manganese is important, whilst lead and zinc occur near the Donetsk coalfield.

With the modern unification of Russia, it is useless to consider the European area alone; the reserves of Soviet Central Asia and Siberia must be remembered. It is claimed that the territories of the U.S.S.R. as a whole have adequate reserves of all essential minerals.

Salt. Salt is obtained from the dry south-eastern tracts north of the Caspian Sea, as well as from the Black Sea and from the northern and southern ends of the Urals.

Climate. There are certain outstanding features of the climate of Russia which deserve special emphasis. In winter (as shown in the isotherm map for January, Part I Fig. 14) the whole vast territory, with the exception of a small strip in the south, suffers from an average temperature below freezing. As one goes northwards so the period during which the country is ice-bound steadily increases.

During the long winter outdoor occupation such as agriculture become impossible, and a prolonged annual pause in the life of the country is the result. The Moscow district, for example, has a vegetative period when crops are growing of 180 days—less than half the year; in the north, in the Forest Belt, this is reduced to less than 100 days.

In the summer, on the other hand, high temperatures are the rule. Temperatures of over 80° are recorded right from the Arctic Ocean to the Black Sea.

When one considers rainfall, the north has a small but adequate precipitation owing to the high humidity; the centre has, broadly speaking, enough; whilst in the south one passes through the steppe

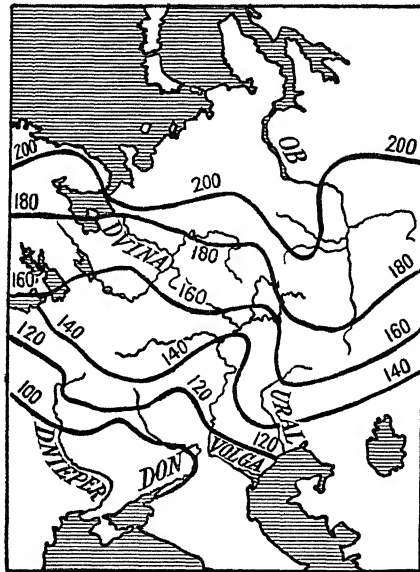


FIG. 311.—The rivers of Russia, showing the number of days per year on which they are ice-bound.

zone, with its spring rains, into the belt of desert round the Caspian. But much of the steppe zone suffers from irregularity of rainfall, so that years of bounteous harvest when complete harvesting presents great difficulty may alternate with years of terrible famine when thousands in the past died of stark starvation (as in 1911 and 1921).

These areas have received special attention under the Soviet régime. Shelter-belts of trees to prevent erosion by wind have been planted and extend for hundreds of miles.

Rivers. The peculiar importance of Russian rivers is really connected with three groups of geographical factors—position,

topography, climate. In the first place, because of the enormous size of the country and the consequent inadequacy of man-made highways of road and rail, the rivers play a large part in providing means of communication. But it is unfortunate that more than half the country lies in the basin of the Volga, which drains to the south-east (in the wrong direction) to the desert lands surrounding the sparingly useful Caspian Sea. The important Northern Dwina flows northwards to the Arctic Ocean, the Western Dwina passes through alien territory before reaching the Baltic. But to the south the Dniester, Dnieper, and Don drain to the Black Sea. In the second place, the low relief is responsible for the enormous stretches of river uninterrupted by a rapid or waterfall. But at the same time it is the low relief—even the Valdai Hills from which the great Volga takes its rise are scarcely a thousand feet high—which results in the tortuous windings and the presence of sandbanks and shallows. It is the climate, however, which really reduces the usefulness of the rivers. Shallowing in late summer is succeeded by winter's grip, and the map shows the period during which the rivers are ice-bound. After the thaw in the spring the rivers are again for long impeded by floating ice, and navigation is effectively prevented. The usefulness of Russia's rivers could be and is being increased by canal links as recorded below, but it should be noted at the same time that the river system has impeded the development of both rail and road owing to the numerous costly bridges required.

Mention must be made of the famous river fisheries of Russia—in particular the sturgeon fisheries. Sturgeon roe furnishes the celebrated caviare.

Soil. It is to Russian scientists that the credit is due for realizing that the type of soil produced by weathering depends at least as much on climate as on the character of the underlying rocks. It is possible to distinguish in the European part of the Soviet Union great soil belts running roughly from south-west to north-east.

(a) The tundra soils of the far north are humid and peaty owing to the permanently frozen subsoil (preventing seepage of moisture downwards) and low evaporation.

(b) The podsolis or podsolized soils of the forest belt are ash-coloured soils. They are seen on heathland and some coniferous forest land in Britain; the colour has been removed from the upper layers by the process known as leaching, whilst the lower layers are darker because they contain some humus.

(c) The black earth or chernozem soils are the fertile soils of the steppelands produced under conditions of high evaporation in summer and long freezing in winter.

(d) The chestnut brown soils are found in the drier parts of the steppelands.

(e) The saline soils occur round the north of the Caspian Sea.

The Vegetation Belts and Natural Regions of European U.S.S.R. Russia was, until recently, essentially an agricultural country; the character of the agriculture depends upon climate and soil, with the result that the great natural regions of Russia coincide very closely with the regions which may be distinguished on a basis of natural vegetation. Even on a population map the industrial districts of Moscow and Tula are seen to be mere local developments in the midst of a belt of comparatively constant character.

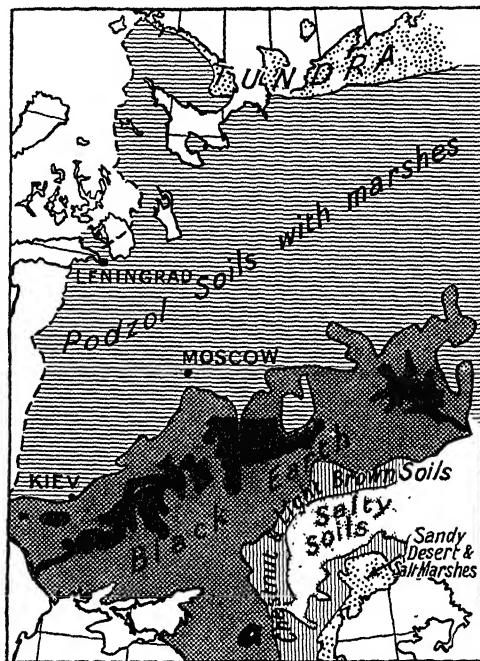


FIG. 312.—The soil belts of Russia.
The richest parts of the black earth belt are shown in black.

The Tundra Region. This is the treeless region of the north, where moss, lichen, summer herbs or grass, and dwarf shrubs form the principal vegetation. Agriculture is impossible, the few poor nomadic inhabitants, such as the Lapps and Samoyeds rely mainly on their reindeer herds and a little fishing in summer. The transport for most of the year is by reindeer or dog-drawn sledges. The most important tracts are usually the more sheltered river valleys, along which tongues of forest penetrate from the south. Owing to the warm waters from the North Atlantic Ocean, the Arctic shores remain free from ice, and *Murmansk*, an ice-free port, has been

connected with Leningrad by rail. Attempts are being made to investigate scientifically the possibilities of pastoral industries, whilst a remarkable industrial development has taken place along the railway to Murmansk—associated with mining for iron, nickel, apatite (for manufacture of phosphatic manures) and electric power works in the Kola Peninsula.

The Coniferous Forest Belt. The podsol soils of this belt vary in character from clays to coarse sands, with the result that large areas of marsh may exist on the clayey areas. These marshy tracts have acted as barriers to communication, but at the same time have formed protective barriers behind which such peoples as the Finns have sheltered from invaders. The two chief trees of the belt are the spruce and the Scots pine; the former prefers wet, heavy soils and so predominates on the clayey soils; the latter prefers the drier sandy tracts. The presence of the deciduous birch and aspen lend further variety to the forest. Little agriculture is possible in the north of the forest belt, but towards the south extensive forest clearings are cultivated or afford pasture for dairy herds. Rye bread and cabbage soup form the two great staples of the peasant diet. Flax is grown round the great glacial lakes of Ladoga and Onega. In the north hunting, fishing, and lumbering are the staple occupations—agriculture becomes more important southwards; various species of deciduous trees become more numerous, and the coniferous forest belt grades insensibly into the next. *Leningrad* (3,500,000) lies roughly where the southern limits of the belt reach the coast.

Notice the position of Leningrad on a deep inlet of the sea, giving access to the interior of Russia, but at the same time easily accessible by water from the industrial countries of north-west Europe. Finland lies to the north of the gulf and Estonia to the south but the U.S.S.R. has absorbed the latter and drawn the teeth of the former by taking possession of the only ice-free port of Hango. Leningrad is blocked by ice for some weeks; *Archangel*, on the White Sea, for five or six months.

The Mixed Forest Belt. On the accompanying map are shown the approximate northern limits of the oak and the normal southern limits of the Scots pine. Roughly between these two lies the mixed forest belt. Here the cultivation of deciduous fruit trees—apples, pears, and cherries—is possible; agriculture is more important and more varied. Indeed, the belt is in the main an agricultural one. The chief crops are flax, rye, barley, oats, and potatoes. Flax and oil seeds together with Russian hemp are exported, but not enough grain is grown to feed the people. The surface is far from monotonous: marshes are still numerous in the boggy hollows, but the better drained valleys favour agriculture and the sandy ridges are largely occupied by Scots pine. Here again the long winter enforces inactivity; the peasant needs some outlet for his energies

during this long, dreary period, with the result that peasant or *koustar* industries are widely developed. In particular the making of wooden utensils of all kinds, woollen clothing, felt boots and caps, homespun linen, furniture, pottery, and toys may be noted. These almost universal peasant industries have had a widespread



FIG. 313.—Forest belts of Russia.

influence. In the first place, the need for exchange and the difficulty of travel and transport over wide distances led to special efforts being made to meet in certain centres at certain times of the year, and so to the institution of great annual fairs, as at Gorky (Nijni-Novgorod). In the second place, the village industry developed naturally in certain areas into a factory industry. This happened in the Moscow industrial region, which was, in pre-Soviet Russia,

almost the only industrial area and where now five towns at least—Moscow (4,500,000), Tula, Yaroslavl, Ivanovo, and Kalinin (Tver)—boast a population of over 300,000.

But the scanty returns of agriculture and the enforced inactivity of winter in the forest belts of Russia have had other effects. The first is the wandering in search of seasonal work by large bodies of peasants which has developed into almost permanent nomadism. The nobility of the old Czarist régime found it necessary to enforce serfdom to prevent seasonal loss of labourers; the present government finds itself in the same position. The encouragement of peasant industries tends to keep the people settled at home; the inadequate supply of fuel (wood in particular) south of Moscow has been supplemented by the erection of electric power stations, using peat or local coal. The natural outlets of this region are Leningrad, and the port of Riga.

The Steppe or Grassland Belt. This belt is not sharply marked off from the last. Oak forests penetrate southwards along the moister valleys, whilst not a little of the most fertile of the "Black Earth region" owes the fertility of its soil to former oak forests. On the northern fringe of the former open oak forests stood *Kiev*. *Kharkov* is another important centre. The rich black soil is ideal for wheat, and this region is one of the great wheatlands of the world. Other crops include rye and barley, and, in the wetter south-west, maize and sugar-beet. The south-west of Russia or the steppe region lies in Ukraine. For long under Polish-Lithuanian rule, Ukraine only became completely under Russia at the end of the eighteenth century. Again after the First World War it became a battleground of opposing forces—German and Austrian, French and Polish, as well as Russian—and it was across these fertile plains that the German armies swept during the Second World War as far as Stalingrad on the Volga. With a large and fertile population, pressure on the land is considerable, so that the most fertile part of the U.S.S.R. is not necessarily the most prosperous. But the possibilities are great in this vast wheatland. The whitewashed orchard-surrounded Ukrainian cottages contrast with the log huts of central Russia and emphasize the difference.

In the steppe belt of Russia lies the great Don coal basin. Near by are rich deposits of iron ore, and large quantities of pig-iron are produced. Manganese also occurs. The outlet of the whole area is naturally by the Black Sea ports, especially Odessa.

The Desert Belt. This belt develops with increasing aridity and increasing salinity of the soil south-eastwards from the steppes around the north of the Caspian Sea.

The Southern Crimea. In southern Russia the climate becomes sufficiently genial for the growth of the vine. In the south of the Crimea, sheltered from cold northerly blasts by the east-west

mountain ridge, is a small tract which may even be called "Mediterranean." But there is a tendency to exaggerate grossly its area and importance. The pleasant climate has led to the growth of several seaside resorts, including Yalta.

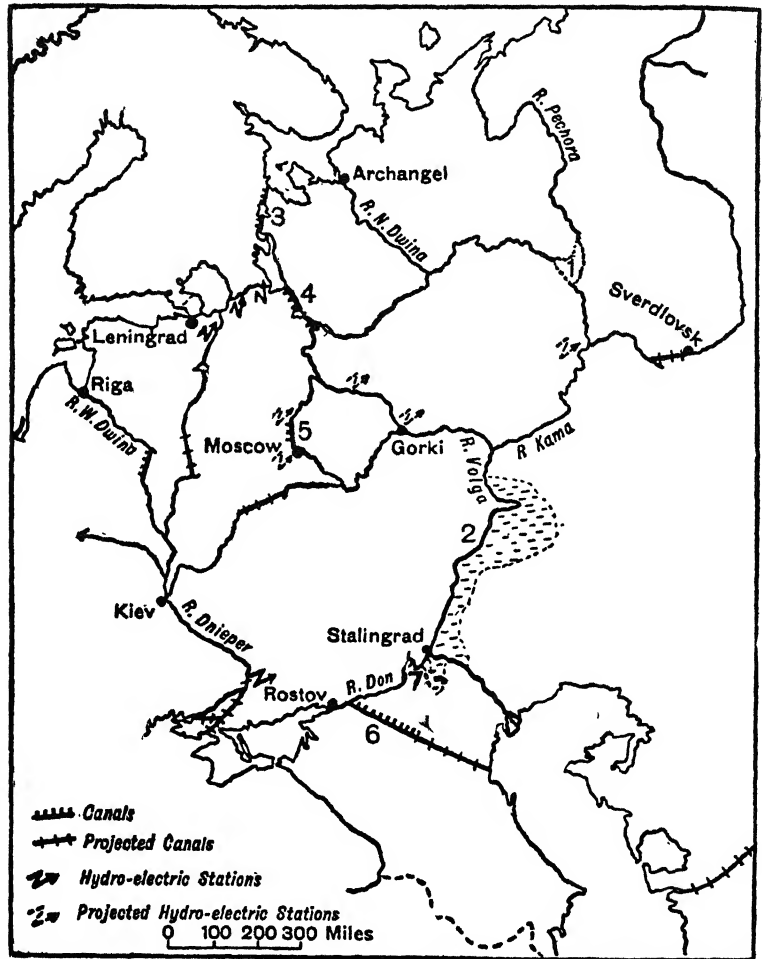


FIG. 314.—Waterways of European Russia.

1. This is a proposed reservoir, the object of which is to maintain a steady flow in the rivers. 2. The territories near the Volga which it is proposed to drain. Canals.—3. The very important "Stalin" or White Sea Canal linking the Baltic with the White Sea and giving Russia a water outlet open for most of the year, which is not "controlled" by any other power. 4. The Baltic-Volga Canal. 5. The Volga-Moscow Canal. 6. The "Maryshsk" Canal, under construction to link the Black Sea and the Caspian Sea. 7. The Volga-Don Canal.

The Caucasian Regions. Stretching between the Black Sea and the Caspian Sea is the great rampart of the Caucasus Mountains,

with its snow-capped peaks and forested slopes. The contrast with the steppes to the north is emphasized by a change in the characters of the people—the typical independence of mountain peoples which is recognized in the present constitution of Russia by the institution of a number of autonomous regions. Across the rampart lie Georgia, Armenia, and Azerbaijan, whose peoples for long resisted the Russian yoke and which to-day are separate Soviet socialist republics within the federation. The capital and centre of Georgia is Tiflis, of Armenia Erivan, and of Azerbaijan the oil town of Baku.

In the west the lowlands along the Black Sea enjoy conditions of temperature combined with high humidity and heavy rainfall which merit the description *sub-tropical*. Rice and tea are grown here.

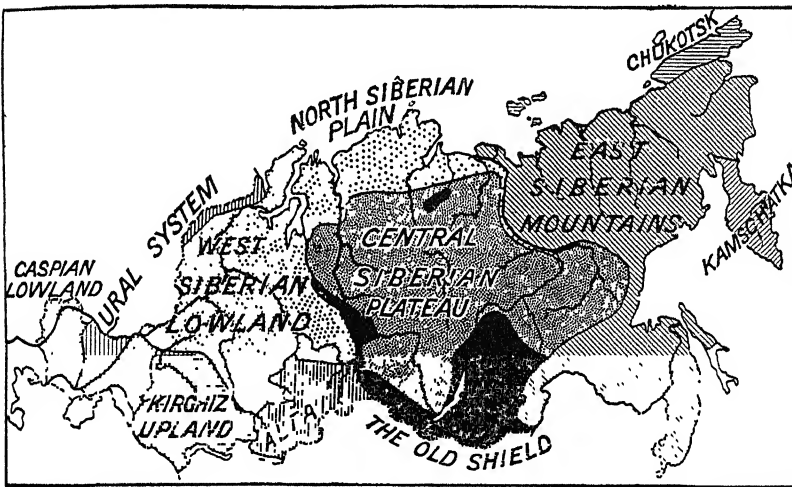


FIG. 315.—Siberia: structural regions (after Schultze).

The Urals. The Ural Mountains are also famous for their richness in minerals. Platinum, gold, copper, and large quantities of iron ore are obtained, and have given rise to much industrial activity in recent years, including the establishment of Magnitogorsk.

The Regions of Asiatic U.S.S.R. This vast and rapidly developing area can only be considered very briefly. It comprises the regions shown in Fig. 315.

Western Siberia, a great plain cultivated on extensive scale in the south, forested in the north.

Central Siberia, stretching from Yenisei River to the Lena River, comprises:

- (i) The relatively small North Siberian Plain along the borders of the Arctic Ocean.

(ii) The Middle Siberian Plateau, a vast area of ancient rocks worn down in the course of ages to the level of a low plateau, comparable in character to the Laurentian Shield of Canada and known to geologists as Angaraland.

(iii) The mountainous region around Lake Baikal, known as the Old Shield of Asia, and including the border ranges and actual portions of the Central Plateau of Asia.

Eastern Siberia, lying east of the Lena River, comprises:

(i) The mountain lands of Eastern Siberia, with several curvilinear festoons of lofty mountains still largely unexplored, but of which the Stanovoi Mountains and the Verkhoyansk Mountains are the best known.

(ii) The Peninsula of Kamschatka, and

(iii) The Peninsula of Chukotsk.

Soviet Central Asia, comprising:

(i) The Kirghiz Upland, mainly dry steppes and desert.

(ii) A group of valleys and plains, much irrigated, once populated and forming a group of non-Russian states within the Union.

The climate of the whole of Soviet Asia is essentially continental. The winter is very long and very cold, but the air dry and bracing and the skies cloudless, snowfall in the winter as a rule not exceeding a few inches. In winter the coldest spot on the earth's surface, or the "cold pole" of the earth is located in Eastern Siberia. From this cold pole there is a steady increase in temperature in all directions. Resulting from the extreme coldness in the interior of the continent there is a very marked high pressure centre from which winds blow outwards in all directions, and these winds are responsible for the small winter snowfall of Siberia. In summer the whole of Siberia is comparatively warm, and there are inblowing westerly winds, though they are but light and the rainfall is slight or moderate. Over most of the country the total precipitation is between 10 and 15 inches, but, coming as it does in the early summer, it is nearly all available for crops. The large rivers all flow northwards to the Arctic Ocean, that is to say, towards the cold regions. In the spring the ice on their upper courses melts long before the warmth has affected the lower courses, with the result that flood waters are unable to escape through the blocked mouths and overflow the banks in the middle portions of their courses, giving rise to enormous flooded areas. This is one of the difficulties in the exploitation of the forest country. In discussing the climate of Siberia it is very common to over-emphasize the long, severe winter, but it should be noted that the warm summers permit agriculture to be carried on far to the north, just as one finds in the prairies of Canada.

Throughout the country as a whole the average density is only about three persons per square mile, and, broadly speaking, the inhabitants fall into two groups, (1) the aborigines, who are mostly Mongolians and consist of a number of primitive tribes scattered through the country, and (2) the immigrants, who started to colonize the south four centuries ago, but who did not start arriving in numbers until about 1896, and whose settlement was very greatly encouraged by the completion of the Trans-Siberian Railway in 1902. Every one, of course, has heard of the use of Siberia as a penal settlement, but it is not always remembered that only a small proportion of the exiles were criminals. A very large number were religious exiles, who from the very nature of their "crime" were enlightened and progressive people, and have done a great deal towards the effective opening up of the country. Nevertheless it was not until colonization by free settlers was encouraged that the country began to make real progress. Settlement is concentrated in, one might almost say restricted to, the steppe land belt and the belt immediately to the north where agriculture is possible.

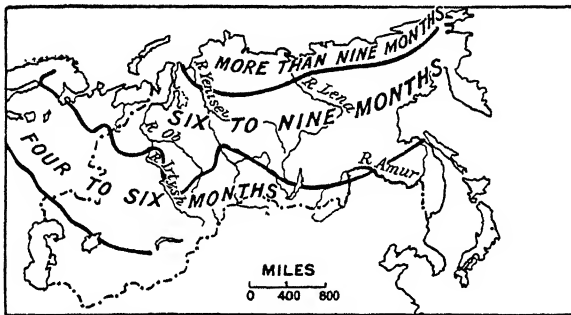


FIG. 316.—Map of Siberia showing the duration of the period during which the rivers are frozen.

According to the Census of 1926 about 85 per cent. of the population was rural. At that time only three towns (Omsk, Novo-Sibirsk, and Vladivostok) had over 100,000. By 1939 the towns had doubled or even trebled in size and at least eight had over 100,000 people including Omsk, Novo-Sibirsk, Vladivostok, Irkutsk, Tomsk, Barnaul, and Krasnoyarsk—and many others had a population of over 50,000. During the Second World War when Germans occupied so much of European Russia, the expansion of the Asiatic towns was literally staggering. The position of the chief towns in relation to the Trans-Siberian Railway should be carefully noted. It is interesting to notice that opposition to the railway resulted in its skirting some of the larger settlements, much to the later regret of the inhabitants. Tomsk, for example, is off the main line, but has since been connected by a short branch line.

In general the conditions in the agricultural belt of Siberia are comparable with those in the prairies of North America. In the five-year period 1911-15 21 million acres were under cultivation. Of this vast area grain crops occupied 94 per cent. (spring wheat, 48 per cent.; oats, 28 per cent.; rye, 14 per cent.; barley, 4 per cent.), followed by potatoes, 2 per cent.; flax and hemp and miscellaneous, 4 per cent. According to the "Spring Sowing Plan" of 1935, 30,000,000 acres were to be planted in the area here called Siberia. The best black soils, comparable to the soils of the Black Earth region of Europe, are devoted largely to wheat, the poorer reddish soils mainly to rye and other crops. It has been estimated recently that there is additional land in Siberia suitable for crop raising of 200 million acres, sufficient to accommodate at least 20 million people, and the acreage under wheat alone might reach 150 million acres, or six times the total at present under that crop in Canada. Thus Siberia is not without reason sometimes called the "storehouse of the future." The main problem in development, apart from the difficulties resulting from the present political administration, is the cost of transport.

Livestock is especially important in the Kirghiz steppe lands, that is to say, the southern portion of Siberia proper, whilst very important indeed is the rapid rise of co-operative dairying, both in the steppe lands and the fertile valleys amongst the mountains of the border. Before the First World War Russia ranked second to Denmark in the quantity of butter exported, and there is no doubt that the output could be enormously extended. In addition to an estimated number of over 11 million cattle, Siberia has 15 million sheep, 3½ million pigs.

Soviet Central Asia, with such famous centres as Bokhara, Samarkand and Khokand, plays a very important part in Soviet economics by supplying raw cotton and other tropical or sub-tropical produce.

Communications. Of the quarter of a million miles of inland waterway, 54,500 miles are navigable by steamers and another 110,000 miles by rafts. Fig. 314 shows the navigable waterways with the existing and projected canals. By way of contrast the total mileage of railways, including Soviet Asia, is about 70,000 (compare Great Britain alone, 20,000 miles). The Soviet railways are of broader gauge than those of the rest of Europe. So trains cannot run direct from Russia to Western Europe. Civil aviation, as might be expected in a country of such vast distances, has made rapid strides in the U.S.S.R. About 150,000 miles of regular routes are operated; in winter the planes are furnished with skis, which enable them to alight on and take off from snow surfaces.

Internal Trade and Industries. In a soviet republic all private property in land is abolished, all land being the common property

of the people. All forests, mines, waters, and livestock are national property; the State owns all factories, railways, and buildings.

With such absolute control, the State set out to convert Russia

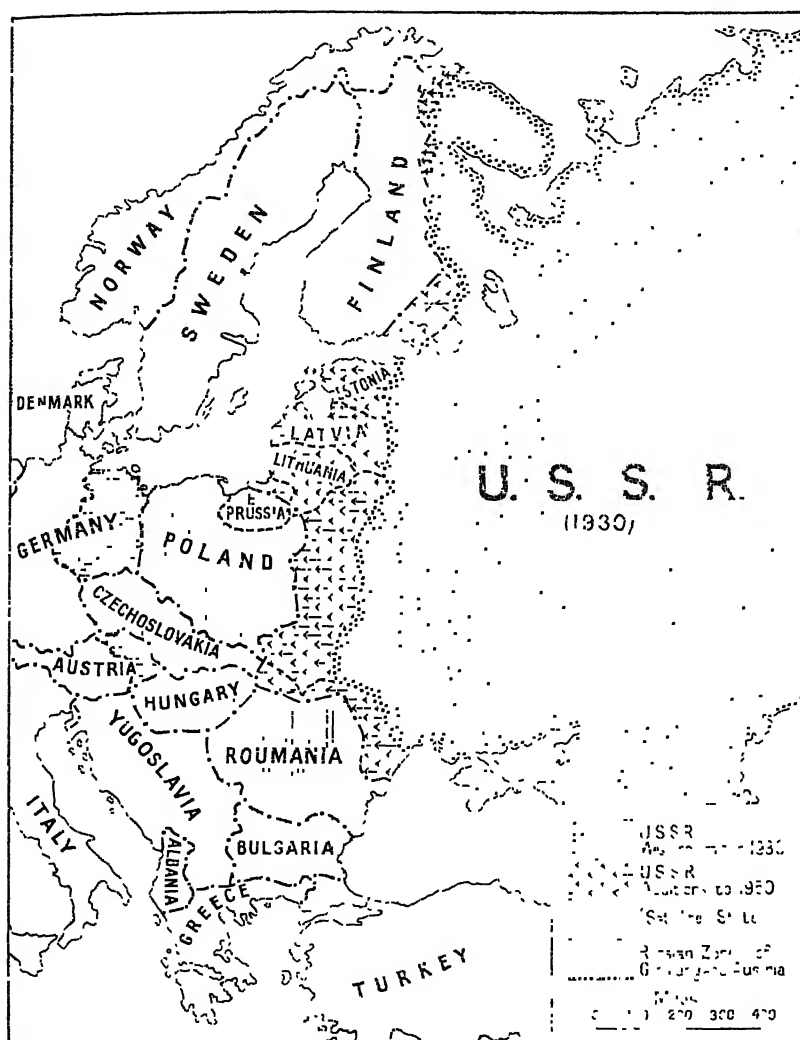


FIG. 317.—The westward march of Soviet Russia.

from being in the main a primary producer to a self-sufficing secondary producer, and the first "Five Year Plan" (1928–32) aimed at industrializing the country in five years, so that it would be independent of foreign supplies of manufactures of all kinds. This

was followed by other Five Year Plans but the third (1938-42) was interrupted by Hitler's invasion of June 1941. In 1946 the Supreme Soviet adopted the Fourth Five Year Plan (1946-50). One great result of these plans has been a new form of national consciousness: the realization by one section of the 200,000,000 people of the existence of the other sections. Concurrently has come the development of internal trade and communications.

The U.S.S.R. is a huge country. Before the revolution of October 1917 its needs in manufactured goods were served largely by two centres—St. Petersburg (Leningrad) and Moscow. Neither was well situated relative to raw materials—the former owed its importance to its being *the* port connecting Russia with Western Europe, the latter had to draw its coal from the Donetz Basin, its iron from Ukraine, and its cotton from Central Asia 2,000 miles away. Two other industrial centres were Ivanov and Nijni-Novgorod (now Gorky). It has been the object of the new régime, through the Five Year Plans, to secure a more even distribution of industry and one based more on the availability of power and raw materials and the presence of markets. Already, by the end of 1932 the relative importance of the industrial regions, measured by the percentage of total capital invested in them, was as follows:

1. Central Region (including Leningrad and the Moscow areas)	41
2. Ukraine	22
3. Urals and Kuznetzk Coalfield of Siberia	11
4. Transcaucasia	6
5. Volga Region	5
6. Central Asia	2
7. Other Regions	13

This is important because the switch already made to new areas enabled the country to resist the German invasion of 1941 despite the virtual immobilization of the first two regions.

We may now consider briefly each of the chief industrial regions.

Central Region—Leningrad. Leningrad has the advantage of its position, but it is far removed from a coalfield; its site was formerly a swamp on the border of the almost uninhabited northern forests, far from sources of food and raw materials. The region is now served by the first of the Soviet hydro-electric power stations, as well as by others since constructed, and from stations using peat fuel. Leningrad is concerned with metal and metal-using industries (including electrical machinery) and shipbuilding (especially of icebreakers).

Central Region. Moscow. The factories of the Moscow region formerly used coal from the Donetz Basin. Later much more use has been made of the inferior brown coal of the Moscow Basin, either directly or as electric power. The whole area, together with Gorky and Ivanovo, is linked by an electric grid which is eventually

to cover the whole country. Moscow was pre-eminently the textile city and still produces a large proportion of the cotton fabrics made in the country, but it has now become a great machine-producing



FIG. 318.—The Industrial Regions of Russia

centre and with a large heavy chemical industry. Its clothing industry is noteworthy.

Central Region. *Ivanov.* This region is a close rival of Moscow

in textiles, but both have decreased in relative importance as Soviet Central Asia has grown.

Central Region. Gorky. Gorky is proud of its automobile works and other engineering works.

Ukraine. The industry of Ukraine reflects two things—the abundance of iron ore and coal and the output and needs of a rich agricultural region. On the one hand comes the production of much of Russia's pig-iron. Formerly the coalfield did the smelting receiving the iron ore from Krivoi Rog 300 miles away. Now there are works also near the iron mines. Russia's annual production of pig-iron exceeded 10,000,000 tons in 1934 and had increased to 36,000,000 in 1957. It is claimed that the hydro-electric power station on the Dnieper restored after war-time destruction is the most powerful in the world. With this reserve of power it is not surprising to find an extensive industrialization—with factories for tractors and agricultural implements at Kharkov and many southern points including Odessa and Rostov. The utilization of agricultural produce is seen in the numerous beet-sugar factories, flour mills, and canning factories.

Urals and Kuznetzk Coalfield. Here the major difficulty lies in the occurrence of iron ore and metals in the Urals 1,200 miles from the coal of Kuznetzk. So industry has been developed by the Ural-Kuznetzk Combine operating at both ends. In the Urals the huge centre of Magnitogorsk has arisen, followed by Orsk farther south and by the rebuilding of many works farther north.

Transcaucasia. The non-Russian countries of Armenia, Georgia, and Azerbaijan are cut off from Russia proper by the great rampart of the Caucasus Mountains. Across the mountains there is one motor road—the Georgian Military Highway—but no railway. The railways run round the western and eastern ends only. So Transcaucasia is still isolated, but instead of being neglected is being encouraged to develop its own industries. Some coal is available, abundant oil, and abundant water power. Minerals are at hand and timber from the forests; a local market requires textiles and clothing. Hence the varied industrial development around Tiflis, Erivan, and other centres.

Volga Region. Here lie the great modern centre of Stalingrad and the older one of Saratov in the heart of the agricultural steppe lands and so concerned with supplying the needs of that region.

Minor Industrial Centres. Amongst these may be noted particularly the Kola Peninsula in the far north and the numerous wood-working centres scattered over the north.

Production and Foreign Trade. Russia has suffered very greatly from war, famine, and revolution. From 1917 to 1922 enormous numbers of people died from disease and starvation. Then followed the great expansion of population and the concentration of effort on

internal development rather than foreign trade. Formerly Russia occupied a very important place as a supplier of foodstuffs and raw materials. In the period 1909-13 Russia was the world's leading exporter of wheat, oats, barley, maize, timber, and flax, and ranked second in butter. During the First World War and revolution her place was taken by such countries as Canada, the United States, Argentina, Australia, and New Zealand. The U.S.S.R. never entered again into world trade on a scale commensurate with her size and resources. Since the Second World War trade is with the Russian satellites—Poland, Eastern Germany, Czechoslovakia, Hungary, Roumania, and Bulgaria.

The Baltic States. Along the east coast of the Baltic Sea, south of the Gulf of Finland lie the Baltic States of Estonia, Latvia, and Lithuania. Before the Great War of 1914-18 they formed part of the Russian Empire, then they became independent. Unlike Finland, which consists largely of old, hard rocks from which the ice-sheet removed most of the soil, the three Baltic States belong more especially to the great European Plain. The land is everywhere flat, and is usually thickly covered by glacial sands and clays. The winters are severe, and ice forms over the sea in enclosed bays such as the Gulf of Riga, but the ports on the open Baltic can be kept free of ice, a fact which is important.

All three countries were absorbed by the U.S.S.R. in 1940.

Estonia. The total area of the country was 18,353 square miles, or less than two-thirds of that of Scotland, and the population only a little over a million. Agriculture and dairy-farming are the chief occupations of the people, and about 70 per cent. work on small-holdings. Nearly a quarter of the land is forested, but most of the remainder is cultivated or used for pasture. The climate is somewhat severe for wheat. Rye, oats, barley, and potatoes form the principal food crops. Flax is grown and exported, but the chief exports are dairy produce, timber, and paper. Of considerable importance is the textile industry, raw cotton being imported and cotton goods exported. The capital is *Tallinn*, or *Reval*, situated at the mouth of the Gulf of Finland.

Latvia. Latvia is rather larger than Estonia and covers about 25,000 square miles. Latvians, or Letts number about 2,000,000, mainly farmers, but an increasing number of people are passing from agricultural to industrial occupations. The principal crops according to the area are oats, rye, wheat, barley, potatoes, and flax. The capital was *Riga*, at the head of the Gulf of Riga on the western Dwina. Unfortunately, Riga, being in a gulf, is blocked by ice for many months in the year. The two other chief ports, *Liebaja* (Libau) and *Ventspils* (Windau) are both open nearly the whole year.

Lithuania. This country lies to the south of Latvia, with which

it agrees in general character. The Lithuanians were once a great power in eastern Europe and controlled a large empire in the Middle Ages. Consequently Lithuania during its period of independence 1917 to 1940 claimed Vilna as their capital though it remained in Poland. Lithuania had the important port of Klaipeda, or Memel. Lithuania is again a predominantly agricultural country; the crops resemble those of Latvia.

POLAND

The old kingdom of Poland was once an important country of Europe, but before the First World War was split between Germany, Russia, and Austria-Hungary. Poland is an example of a state with few natural or geographical boundaries. It consists mainly of flat land, and fades eastwards into Russian territory, westwards into Germany. But the country is an ethnic unit, and the Poles are proud of their nationality, and were determined to secure independence for their country. This they did as a republic from 1917 to 1940 when the country was invaded from opposite sides by Germany and the U.S.S.R. In the post-war settlement the Polish Republic became a Soviet satellite. The U.S.S.R. absorbed much territory in the east but Poland took over former German territory in the west.

Poland now has an area of about 121,000 square miles (140,000 in 1917-40) and a population of 28,000,000. In the 1917 settlement the greatest difficulties in determining the frontiers of Poland were encountered in the coalfield of Upper Silesia. Here, on the whole, the towns such as Stalinogrod (Katowice) and Krolewska Huta or Königshütte had a large German population; the rural areas were Polish. Now Poland includes the whole coalfield. The Poles are primarily agriculturists: farming and forestry claim two-thirds of all the people of the country. The whole of Poland except the southern fringe on the slopes of the Carpathians lies on the European Plain, so what has been said concerning the structure, glacial deposits, soils, climate, and agriculture of the plain applies especially to this country. The climate is sufficiently continental in character for the rivers to be frozen for several months of the year.

The country is divisible physically into four unequal east to west strips, but it must be remembered that culturally the division of the country is rather into north-south strips with German influence still marked in the culture of the west, Russian in the east. The physical divisions are as follows:

The Lake Country of the extreme north-west and north-east. This is glaciated country lying within great frontal moraines where numerous lakes occupy hollows in the mantle of glacial deposits. The natural gateway to the Vistula basin is the old city and port of

Danzig. Because it was a separate "free city" from 1917 to 1940 Poland built Gdynia near at hand but now Danzig (Gdansk) is Polish.

The Great Central Plain of Poland is essentially agricultural country, but the whole was glaciated and the character of the agriculture depends mainly on the local character of the glacial deposits. There are extensive sandy ridges (terminal moraines) covered with heathland vegetation (sometimes a source of danger owing to moving sand-dunes) which have, however, been largely afforested (as in



FIG. 319.—Poland.

Germany). There are huge stretches of rolling farmland where the chief crops are rye, oats, barley, potatoes, sugar-beet, flax, and fodder. The climate is somewhat severe for wheat. There are large numbers of cows and pigs also—the basis of the Polish export of bacon and dairy produce. These are often on the damper ground of the broad old river valleys—the *pradoliny* of the Poles. The natural highway of the whole country, the Vistula, passes through the middle of this country and the capital, *Warszawa*, or *Warsaw*, is well placed. It was originally founded on a hill on the west bank of the Vistula, where it commanded both north-south and east-west

routes, and was not liable to flooding, but has since spread into lower ground and has become a great railway junction also with fine bridges across the river. It was largely destroyed during the war and population dropped from over a million to less than two-thirds that total. There is considerable river traffic on the Vistula, especially below Warsaw. Warsaw has developed iron, steel, leather, and textile industries. The centre for the western part of the plain is *Poznan*. The German frontier is now formed by the Oder river and the former German port of Stettin (Szczecin) is now in Poland.

The **Plateau Region** comprises a low plateau largely built up of chalk, but with islands of older rocks. Nearly the whole is covered with a mantle of rich loess, so that this is actually very fertile agricultural country. The south-east is a continuation of the Russian Ukraine. *Lodz*, the cotton manufacturing centre, lies south-west of Warsaw and *Lublin* is another manufacturing centre south-east of Warsaw. The region extends westwards to embrace Lower Silesia and so past Wroclaw (Breslau) to the Czech border.

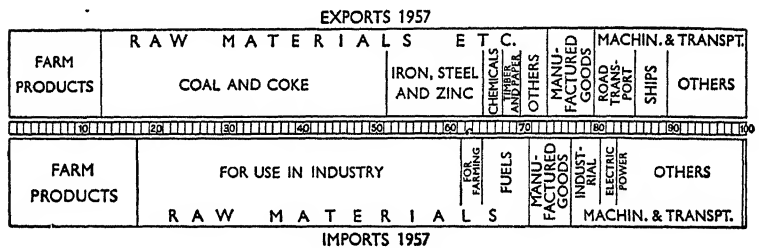


FIG. 320.—The trade of Poland in 1957.

The **Carpathian Region of the South** comprises the forested mountains and their foothills (with some pleasant resorts) and a sub-Carpathian trough. Along the foothills the oilfields, notably at Boryslaw near Lwow as well as the city of Lwow, now lie in the territory of the U.S.S.R. On the Vistula and guarding the old road to Central Europe and Italy is *Krakow*.

Upper Silesia. From 1917 to 1940 the great Silesian coalfield, probably the largest in Europe, was shared between Germany and Poland: it is now entirely in Poland and so is the rich agricultural valley of the upper Oder round the city of Wroclaw (Breslau). Katowice, Gliwice, and Byrtom are the chief towns of the coalfield—centres of iron and steel and other industries.

Trade of Poland. Poland exports timber, wood-pulp and paper, coal and zinc, pigs, bacon, and eggs, sugar, cereals, cotton goods, and mineral oil. A very large proportion of the trade was with Germany, but the timber was exported, *via* Danzig or Gdynia,

largely to Great Britain. Raw cotton heads the list of imports, followed by machinery, apparel, raw wool, and wheaten flour. Since the Second World War Poland has been within the Soviet orbit.

GERMANY

Position and Size. At the conclusion of the Franco-Prussian War of 1870–71, in which the Prussians were victorious and wrested the provinces of Alsace and Lorraine from France, the Prussians led the union of numerous German-speaking states of northern Europe and the German Empire was born. The King of Prussia became Wilhelm I, Emperor of Germany or Kaiser. The country then (1871) had an area of about 209,000 square miles and a population of 41,000,000. The Empire soon began to acquire colonies in Africa and elsewhere and expansionist policies led to the First World War of 1914–18, the defeat of Germany and the abdication of the Kaiser. On November 9th, 1918, two days before the Armistice, Germany became a republic. By the Treaty of Versailles Germany lost 27,250 square miles of territory, the principal losses being Alsace-Lorraine (5,600 square miles) restored to France and 17,800 square miles to the new state of Poland. The new republic had an area of 181,000 square miles (excluding 738 square miles of the Saar) with a population of some 66,000,000 in 1933. Germany became one of the largest and most populous countries of Europe outside Russia. Then came the rise to power of Hitler and in 1938 Germany absorbed Austria and later the fringes of Czechoslovakia. The attack on Poland led to the Second World War of 1939–45 and the defeat of Germany. Germany was divided into four occupation zones with the four occupying powers sharing Berlin. Large sections of eastern Germany—all the former territory east of the Oder as well as the whole of Silesia and the great port of Stettin—passed to Poland. The U.S.S.R. consolidated its hold on Eastern Germany which was thus completely cut off both from Western Germany and Western Europe as a whole. On the other hand the three zones of Western Germany were consolidated with the agreement of the occupying powers (United States, Britain, and France) as the Federal Republic of Germany with its capital at Bonn. The German Democratic Republic (Eastern Germany, former Soviet Zone) has an area of 41,400 square miles and a population in 1957 of 17,500,000. The Federal German Republic (Western Germany) covers 94,700 square miles with 53,700,000 people in 1957. These figures include Berlin with 3,300,000 people.

Foreign Trade. The pre-1938 trade of Germany showed about three-quarters of the exports were a wide variety of manufactured goods going to practically every country in the world. There was also an export of coal and some “food-stuffs”—principally sugar.

More than four-fifths of the imports were raw materials for manufacturing industries, and food-stuffs. The close comparison with Britain is noteworthy, though the dependence on imported food was less.

Eastern Germany has now become intimately associated with the Soviet economy. Western Germany has so far recovered from the ravages of war as to have balanced exports and imports and German goods once more penetrate to most countries in the world.



FIG. 321.—Germany.

Physical Features. Germany falls into two main divisions:

- (a) The North German Plain, part of the great European Plain, covered by a thick mantle of glacial clays and sands.
- (b) The Southern Highlands and Alpine Foreland, a varied complex of plateaus, hills, low mountains, and valleys, occupying the southern half of the country and sloping, on the whole, northwards from the Alps.

Almost as fundamental as this division of Germany into two halves, a northern and a southern, is the division of the country into the great river basins. The four chief rivers all flow northwards or north-westwards: the Oder, now the eastern boundary and mainly in Poland, to the enclosed Baltic; the Elbe, Weser, and Rhine to the North Sea. Three of these—the exception being the Weser—rise outside Germany and flow right through the country. With the exception of parts of the north coast nearly the whole of Germany lies in the basins of these four great rivers, and in each case the river forms the main artery of the basin through which it flows. It is unfortunate for Germany that the finest of her rivers, the Rhine, enters the sea through Holland. But fortunately both the Elbe and the Weser, which might otherwise flow into the land-locked Baltic, have been deflected westwards by the presence of morainic ridges.

Geology and Minerals. The solid rocks which must make up the floor of the North German Plain emerge but rarely from beneath the thick mantle of glacial deposits, and hence it is the latter which determine the character of the surface. As in the Baltic lands and Poland, the soil afforded is not naturally fertile; ridges of coarse sand which mark stages in the retreat of the ice sheet and which, incidentally, with a N.W.-S.E. trend, have influenced the direction of the German rivers to a marked degree, alternate with water-logged tracts overlying the areas of clay.

Southern Germany is, geologically speaking, a complex area. The plateau regions are built up of sedimentary rocks, the more rugged areas either of masses of old rocks (Vosges, Black Forest, Thuringian Forest, Ore Mountains or Erz Gebirge, Harz Mountains, and the massifs on either side of the Rhine gorge), or of volcanic masses of comparatively recent date (the Eifel, Vogelsberg, etc.). Geologically and geographically the rift valley of the Upper Rhine is an interesting and remarkable area. Economically the coalfields are the most important parts of South Germany, but the density of population is high on many parts of the plateau owing to the fertile soil, sheltered valleys, and minerals.

Among European countries Germany ranks after the United Kingdom in value of her mineral production: the principal minerals are coal, lignite, iron ore, zinc, lead, and copper ores, rock salt and potash salts.

Coal. The output of coal in Germany increased rapidly after the First World War and reached 186·7 million metric tons in 1938. Out of this total 140,000,000 tons came from the territory which is now the Federal German Republic, mainly from the Ruhr. The Ruhr was naturally a main target for bombing so that western Germany's production of coal in 1946 was down to 54,000,000 tons. It recovered to 133,000,000 in 1957.

Lignite. Lignite, or brown coal, assumes a much greater importance in Germany than in most countries of the world. The production in 1925, 1926, and 1927 was nearly 140,000,000 metric tons. In 1938 it reached over 195 million metric tons; of which 69 million metric tons came from what is now the Federal Republic. This area yielded 95,000,000 tons in 1957. The lignite fields lie mainly in Saxony and Prussian Saxony, the Thuringian states, and on either side of the Rhine above Cologne. The value of the lignite has been greatly enhanced by using it on the spot for the development of electrical power. Mineral oil, of which Germany has considerable quantities in Hanover and elsewhere, is also obtained from lignite.

Iron Ore. Having lost the great Lorraine fields, Germany's principal home supplies of iron ore are the Siegerland deposits in the valley of the Sieg, a tributary of the Rhine. These ores have a high iron content and are rich in manganese. They are smelted in the Ruhr. Even before the First World War, the Ruhr iron industry, though using Lorraine ores, was becoming more and more dependent on supplies imported from Sweden and Spain.

Zinc and Lead are obtained in the Rhine Province near Aachen. *Copper* is produced chiefly in the Harz, at Mansfeld. The deposits of the Ore Mountains (Erz Gebirge) are much less important than formerly.

Salts. The chief salt-producing district in Germany is in the Prussian province of Saxony (now in East Germany). The potash salts of Stassfurt in this region which overlie a bed of pure rock salt are very important and have made Stassfurt one of the leading seats of chemical industries in the world.

Climate. The climate of Germany is intermediate in character between the oceanic climate of North-West Europe and the continental climate of Poland and Russia. The bulk of the country lies in the region of the "Central European type." Broadly speaking, as one goes from west to east the winters become colder and the summers warmer. In Southern Germany, aspect is important, and many of the valleys, including the Rhine Rift, have comparatively mild winters, permitting the cultivation of the vine.

Vegetation. The higher hills and mountains are clothed with valuable coniferous forests, and forestry in Germany is an industry of great importance, conducted under the care of the State on scientific lines. The forest area is 24 million acres, of which 17 million are in the Federal Republic. Three-quarters are coniferous and the rest oak, birch, ash, beech, etc.

Agriculture. Of the present extent of Germany arable land covers about 40 per cent.; pasture and meadow land about 20 per cent. Hay, rye, oats, potatoes, wheat, barley, and sugar-beet are the chief crops.

Hay crops cover nearly a third of the arable land.

Rye is still the most important cereal crop. This is, in large measure, an indication of the poverty of the soil in northern Germany.

Oats are extensively and widely grown, but *wheat* and *barley* are mainly crops of Southern Germany. The average yield is lower than in the United Kingdom.

Potatoes are important in Germany as a source of industrial alcohol. This accounts for the fact that they occupy many times the acreage in Germany that they do in the United Kingdom.

Sugar-beet is a crop of the greatest importance, especially in central Germany around Magdeburg, and Germany is the premier beet-sugar producer in the world. The production of sugar-beet in the Federal Republic reached a record to date in 1957 of nearly 10,000,000 tons. Other crops not mentioned above include hops (especially in Bavaria), tobacco, the vine, and fruits.

Domestic Animals. The Federal German Republic has over 11,000,000 cattle. By way of contrast there are less than 2,000,000 sheep, but nearly 13,000,000 pigs and 600,000 goats (1957). The numbers of horses are decreasing as in other parts of the world.

Fisheries. Germany shares to a considerable extent in the North Sea fisheries, the Federal catch in 1956 totalling 770,000 metric tons. The Baltic fisheries are comparatively small.

Population. Out of the total population the bulk are classed as urban, and in this respect Germany bears comparison with Great Britain. Berlin has over 3 million inhabitants, Hamburg over 1.6 million (compare Greater London and Liverpool with Birkenhead). There are no less than 60 other towns with over 100,000 inhabitants (1956) of which 9 are in Eastern Germany. There is the marked concentration on the coalfields as in Britain, but again the metropolis lies away from any coalfield.

Manufactures. The whole of Germany is now predominantly a manufacturing country, though the great development of the country did not begin until the seventies of last century when the federation of the German States and the receipt of an indemnity of £200,000,000 from France after the Franco-Prussian War afforded the necessary stimulus.

Iron and Steel. The chief seats of the German iron production are the Ruhr, and the Saar; to a smaller extent in Bavaria, Hanover, and Saxony. Remarkable progress has been made in engineering and shipbuilding industries—the latter at Hamburg and Kiel in Western Germany, Lübeck and Rostock in Eastern Germany.

Textiles. The textile industries give employment to a million people, and the clothing industries to rather more. The various branches of the textile industry are much more widely distributed and less localized than in the United Kingdom. Thus *Wuppertal* (formerly *Barmen* and *Elberfeld*) on the Ruhr coalfield carry on all

branches of the textile industry, *Chemnitz* (Eastern Germany) is the "Saxon Manchester," but also manufactures textiles other than cotton as well as machinery. The great German cotton market and place of import of raw cotton is *Bremen* on the Weser.

Chemicals and Electrical Apparatus. The advanced state of technical education in Germany was largely responsible for the pre-eminence attained in these characteristically German industries—a pre-eminence still largely maintained.

Sugar-refining and Brewing are two industries connected with German agriculture. Other industries will be noted later in connection with the regions in which they are developed.

Communications. Mention has already been made of the importance of German waterways—nearly 6,000 miles of rivers or canalized rivers, and nearly 1,400 miles of canals. A far higher proportion of merchandise is carried on the inland waterways than in Britain. The Federal Republic has a close network of railways, the density being approximately that of Britain. Germany pioneered in the construction of motor highways or *autobahnen*.

Ports. The marked division of Germany into river basins has already been noted. Each river basin has one or more great ports serving as its outlet. *Hamburg* is the greatest of them all, and serves primarily the Elbe Basin. Before the separation of Eastern Germany the industrial hinterland thus included Saxony and also a large part of Czechoslovakia. *Bremen* serves the Weser Basin. An attempt has been made, by constructing the Ems-Dortmund Canal, to make Emden the great port of the Rhine Basin, but the bulk of the foreign trade of the Rhine Basin still flows through Holland via the ports of Amsterdam and Rotterdam, and to a less extent via the Belgian port of Antwerp.

The Natural Regions of Germany

The marked difference between the Great Plain of Northern Germany and the highlands of Southern Germany is easily recognized, but the division of the latter into natural regions presents some difficulty, and may perhaps best be made on a basis of river basins, or by separating first of all the coalfields and industrial regions. The scheme given below is an outline scheme only.

Eastern Germany comprises essentially the eastern half of the north German plain (with part of the Baltic coast) and what is called below the Saxony Industrial Region, with part of the Harz.

Western Germany comprises the other regions described below.

The North German Plain is essentially an agricultural region. In many places the soil is dry and sandy, especially along the forested ridges (the Baltic Heights) which border the Baltic Sea, but has been carefully cultivated; in other places marshes and bogs have

been drained, so that now more than half the plain is cultivated, a quarter used for cattle-grazing, and most of the remainder is woodland. The most important grain is rye, next comes oats, but wheat will only grow in a few places where the soil is richer. Large areas are used for potatoes (from which alcohol is made) and sugar-beet. Germany produces more beet-sugar than any other country.

Agriculturally the richest tracts are along the southern border of the plain, where it commences to fade into the hills, where rye gives place to wheat, and where are the foci of sugar-beet cultivation.

Berlin, Germany's pre-war capital, lies in the heart of this region; from it all parts are easily reached by rail. On the Baltic Sea are the ports of *Rostock* (Eastern Germany), *Lübeck* and *Kiel*, the latter at the Baltic end of the Kiel Canal. The Baltic seaports suffer by being blocked by ice in winter. Generally speaking, the Baltic coast of Germany is a shallow shelving coast, and the large lagoons, called *haffs*, by which it is fringed are usually too shallow to be used by large vessels. It is the short length of North Sea coast which is of primary importance to Germany and emphasizes the significance of *Hamburg*. By far the largest port of Germany, Hamburg is more than the outlet of the Elbe Basin, which it primarily serves. *Bremen*, on the other hand, is mainly the outlet of the Weser Basin, including Hanover. The significance of *Emden* and the Ems-Dortmund Canal has already been emphasized.

Apart from Berlin, the large inland centres of the North German Plain are nearly all situated along the richer agricultural southern margins—Osnabruck, Hanover and Brunswick in Western Germany, Magdeburg and Leipzig in Eastern Germany.

The Rhenish-Westphalian Industrial Region, including the Ruhr coalfield. The great industrial region of the Lower Rhine has a detached area around Aachen (Aix-la-Chapelle) where the extremity of the great coalfield of Belgium lies in German territory, but the main part of the region lies along the banks of the Rhine from Cologne to Ruhrort and on the great Ruhr coalfield. Iron and steel may be regarded as the basic industry of the region, and is carried on especially at Essen, along the narrow valley (the Enneperstrasse) between Wuppertal and Hagen, at Dortmund, Dusseldorf, and Duisburg. Remscheid and Solingen are the centres for cutlery steels. The textile industries are concentrated at Wuppertal (woollens, silks, etc.), Krefeld (silks and velvets), Aachen (woollens), Dusseldorf, Munchen-Gladbach (linen, cottons, woollens), Duisburg, at the junction of the Ruhr and Rhine, carries on shipbuilding, but the great river town is the bridge town of Köln (*Cologne*) engaged in a great variety of manufactures, including textiles, machinery, scent, cocoa, and chocolate.

The Rhine Gorge Massifs. Between Mainz and Bonn the Rhine flows through its famous gorge, with mountainous massifs of

old rocks flanking it on either side. On the west are the Hunsrück and the Eifel—separated by the valley of the Moselle—on the east are the Taunus, Westerwald, and Sauerland. In the valley of the Sieg lie the iron ore deposits of Siegen. The mountains are largely

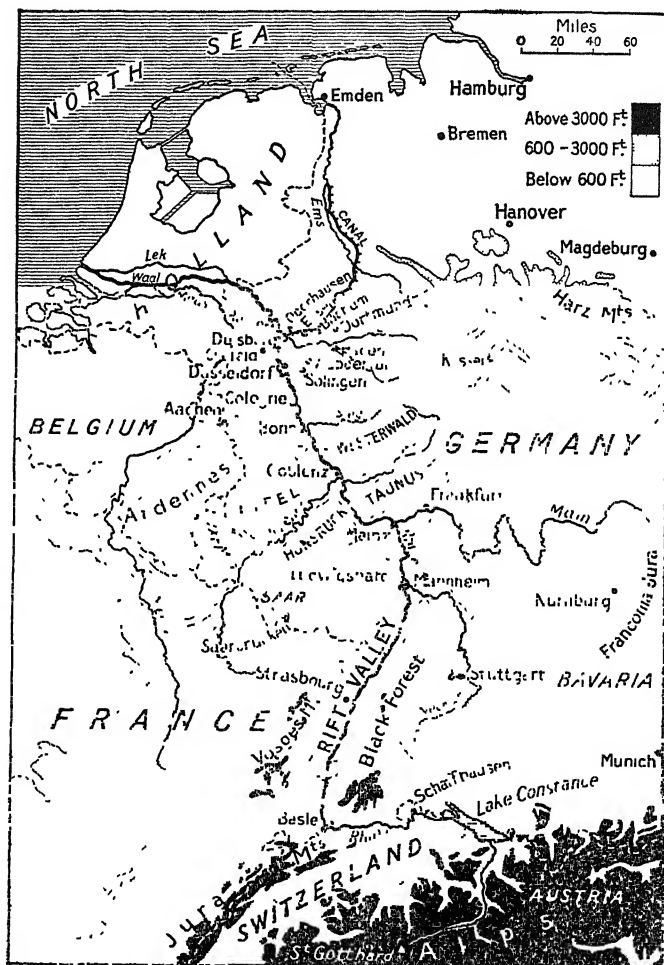


FIG. 322.—The Rhine Basin.

forested, but in the sheltered Moselle valley, as well as in the Rhine valley itself, the vine flourishes. Koblenz is a large town at the junction of the Moselle and Rhine.

The Rift Valley of the Rhine. Between the Swiss frontier and Mainz, the Rhine flows through a broad, fertile valley forming a

rich agricultural region where barley, wheat, tobacco, the vine and fruit are leading crops. West of the Rhine, part of this plain lies in France; east of the Rhine its limits are sharply defined by the heights of the Black Forest. With this region may be grouped the fertile lower valleys of the Neckar and Main. Industrial centres have grown up at Frankfurt (machinery, chemicals, brewing); Mainz (leather, machinery); and Ludwigshafen-Mannheim is an important distributing centre at the junction of the Neckar and Rhine.

The Bavarian Uplands. With the exception of the Rhine valley the whole of south-western Germany is occupied by a great stretch of upland, nearly all over 1,000 feet above sea-level, lying between the Black Forest on the west and the Bohemian Forest on the east, and extending from the Alpine foreland on the south to the Thuringian Forest, the Harz and the Rhine massifs, already mentioned, on the north. Naturally, this large area varies greatly. The hillier parts are usually clothed with valuable coniferous forest, interrupted in some areas by hill pastures supporting numbers of sheep, and along the Alpine foreland by an extensive dairying tract. The less rugged parts have good soils and enjoy a better rainfall than is found in Northern Germany, with the result that barley, oats, and wheat are grown in large quantities. The sheltered valleys are the richest regions; those of the Neckar, Main, and Upper Danube deserve special mention. Munich is celebrated for its beer, but both Munich and Nürnberg are examples of towns not well situated in relation to coal, raw materials, or communications, which have developed important industries in the manufacture of small articles requiring little raw material—toys, pencils, electrical apparatus, instruments. It is obvious that the development of the first two has been influenced by the local supplies of suitable wood; the economic factor is evidenced in the manufacture of metal toys which followed that of wooden toys. Stuttgart, the chief town of the Neckar Valley, manufactures hosiery and cotton goods, and has a large printing trade.

The Franconian Jura, which run obliquely across the great upland tract, are sometimes separated as a distinct region.

The Harz Mountains and Surrounding Region. The Harz Mountains are forested, but the low hills of Brunswick and Hanover by which they are flanked on the north form a rich agricultural area in which sugar-beet, wheat, and fruit are particularly important, and which has already been noted as lying on the southern side of the great German plain. The boundary between Eastern and Western Germany passes through the heart of the Harz Mountains.

The Saxony Industrial Region. Primarily Saxony is a rich agricultural region with sugar-beet, wheat, barley, rye, oats, and potatoes as leading crops and belonging to the rich agricultural

belt which flanks the great German plain on the south. The presence of basins of bituminous coal around Zwickau, Chemnitz, and near Dresden, and of lignite in several basins farther north has, however, been largely responsible for the industrialization of much of the region. The textile industry was favoured at an early date by the supplies of wool from the sheep pastures on the slopes of the Erz Gebirge; the minerals (not now of great importance in the Erz Gebirge) and forests of the mountains afforded other supplies of raw materials. Woollen manufactures are still carried on, but Saxony has become the great seat of cotton-working in Germany, with Chemnitz and Zwickau as the leading centres. The famous Dresden china is actually made now at Meissen, Dresden being concerned rather with machinery. In the north of Saxony, on the borders of the plain, lies Leipzig, a famous old centre of trade (symbolized by the Leipzig Fair) and learning (symbolized by its printing and publishing trade).

DENMARK

Denmark is a very small country, with an area of 16,600 square miles and a population of 4,400,000. It consists of the low peninsula of Jutland and a group of islands in the Baltic Sea. The whole land is very flat, and there is no hill more than a few hundred feet high. Much of the western coastal tract is covered by sand-dunes thrown up by the sea, and there is a considerable proportion of waste land. Forests have been planted to prevent the sand from blowing inland. Although not naturally fertile, no less than three-quarters of the surface of Denmark is cultivated; the yield of crops is very high (sometimes the highest in the world) and the quality good. Denmark is thus essentially an agricultural country and especially a dairying country. There are over 3,000,000 cattle, 4,300,000 pigs, and nearly 25,000,000 hens in the country (1953). The principal products are butter, cheese, bacon, and eggs. Although the country is so small and has no minerals (except limestone for cement and clay for porcelain), no coal, no water-power, and only a poor soil, it is rich and prosperous because of the care with which the people work the land. The success of its agriculture is undoubtedly due in a large measure to the high state of education of the farmers and the co-operative system among them encouraged by the government. There are many factories, but they are nearly all connected with agricultural products—there are factories for making butter and cheese, sugar from sugar-beet, beer from oats and barley, and for the manufacture of margarine. There are good fishing grounds on the shallow west coast, and young fish are hatched in the “Lim Fiord.” The fishing centre and west coast port is *Esbjerg*. The principal town and port is *Copenhagen*, with nearly a million people,

controlling the narrow entrances to the Baltic Sea. Denmark has a well-organized system of railway communications, in which an essential part is played by the train ferries between the islands, and

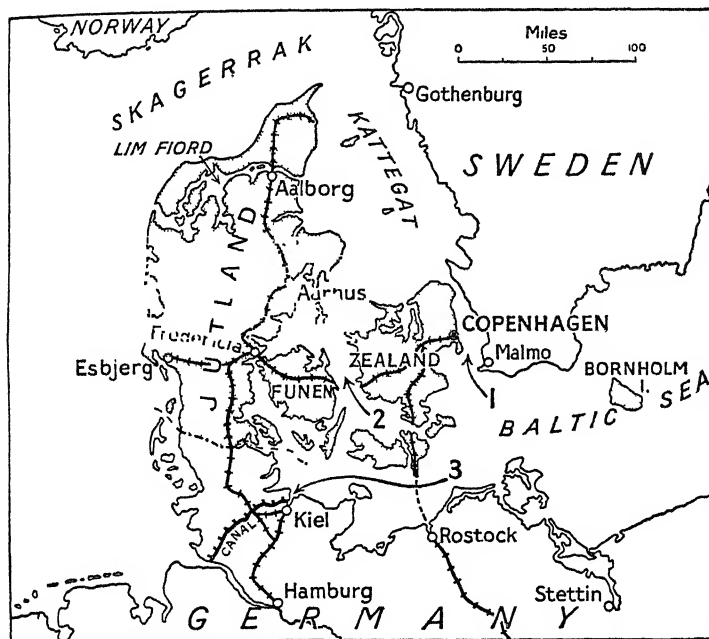


FIG. 323.—Denmark.

The routes marked 1, 2, and 3 show the three chief approaches from the Baltic to the North Sea.

the islands and the mainland. The foreign trade of Denmark is considerable, having averaged at par rate of exchange over £660,000,000 in recent years (1951–53). Dairy produce represents

EXPORTS 1957														
M E A T			O			D			M A N U F.			M A C H I N E R Y		
BACON			OTHERS			BUTTER			EGGS			OTHERS		
												</		

cereals occupy but a small place, showing that Denmark is self-supporting in foodstuffs. The bulk of the imports come from the United Kingdom, Germany, Sweden, and the United States.

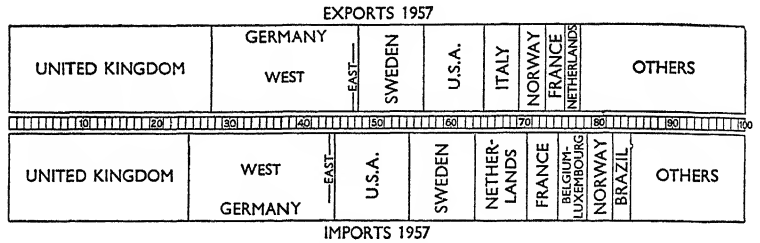


FIG. 325.—Direction of the trade of Denmark.

The Faeroe Islands ("Sheep Islands") belong to Denmark, as well as the great plateau of Greenland. Until 1944, when it became an independent republic, Iceland had been an independent kingdom, but sharing its king with Denmark.

THE NETHERLANDS, OR HOLLAND

Holland, or the Kingdom of the Netherlands (Koninkrijk der Nederlanden), is a small country, only 12,603 square miles in area, but with a population (1957) of 11,000,000 or nearly 870 to the square mile. Much of Holland consists of the combined delta of the Rhine and the Meuse, together with a stretch of low coastland to the north and an area of slightly higher land on the east. The whole country may be described as flat, and it is only in the extreme south-east, where Holland abuts on the Ardennes massif, that there is a small tract of land over 1,000 feet. Holland may be divided roughly into two halves, a western and an eastern. In the western half the soils are alluvial, and there is a fringe of sand-dunes along the North Sea coast. Much of this part of the country is actually below sea-level and has been regained from the sea by centuries of labour. In addition there are large areas which, though above sea-level, lie so low that they cannot be drained by ordinary means. Hence "polders"—enclosures surrounded by dykes or embankments and provided with pumping machinery—are characteristic of much of this part of the country. The soil is rich and moist, well suited to the growth of the finest pasture grasses on which cattle and horses thrive. Agriculture flourishes, wheat being the important cereal crop, and the western part of Holland may be described as a densely populated, thriving, agricultural, dairying country. After many years of discussion, the greater part of the Zuider Zee is now being drained, and has already been made into a lake (Yssel lake) by a dyke.

The eastern half, on the other hand, has a sandy soil of fluvio-glacial origin—the so-called “diluvial” soil—which, in its unimproved state, is much less fertile. Large areas are covered with heathland interrupted by peat-bogs, but on the extensive reclaimed areas large numbers of dairy cattle are reared; the principal food crop is rye in place of the wheat of the fertile west. In the south, on the borders of Belgium, lies the Campine or Limburg coal-field, a comparatively new discovery and an important addition to the resources of Holland.



FIG. 326.—The reclamation of the Zuider Zee.

Dotted areas are the tracts to be reclaimed. Existing land below sea-level shown in black. The lined areas were reclaimed between 1930 and 1945.

In 1912 the production was only 1,700,000 metric tons; in 1931 it had increased to 12,900,000 tons. Naturally it suffered during the war but by 1952 output had recovered to 12,565,000.

Twenty per cent. of the people of Holland are engaged in agriculture. Rye,

oats, wheat, barley, and potatoes are grown for home use; another important crop is sugar-beet. An interesting industry is flower-farming; large quantities of flower bulbs, such as tulips and narcissi, are grown and exported. Very important indeed is dairy-farming. The cattle, fed on the rich pastures of the polders, produce large quantities of excellent milk, from which butter and cheese are made. Holland has nearly 3 million cattle and 2 million pigs. Fishing is important, especially among the islands of the north, and Holland shares in the great herring fisheries of the North Sea. Large quantities of oysters are also produced.

In the Middle Ages Holland had a high reputation as a manufacturing country. In the last century the absence of coal was a great hindrance to the development of manufacturing industries, and large quantities of coal were imported from Germany and Great Britain. During recent years industrial development has been considerable, and at the present time no less than 40 per cent. of the people of Holland are engaged in manufacturing industries of one kind or another.

The cotton industry is mainly carried on in the province of Overijssel, at Enschede, Almelo, Hengelo, etc. The large market for cotton goods in the East Indies, formerly Dutch, has been a great advantage to this industry. Linen and other manufactures are

carried on at *Tilburg* and *Utrecht*. *Delft* has long been famous for manufactures of earthenware. The Rhine, the greatest river of Germany, reaches the sea through Holland, and so it is not surprising that although Holland has little coal and less iron, ship-building and ship-repairing are important occupations at the mouths of the

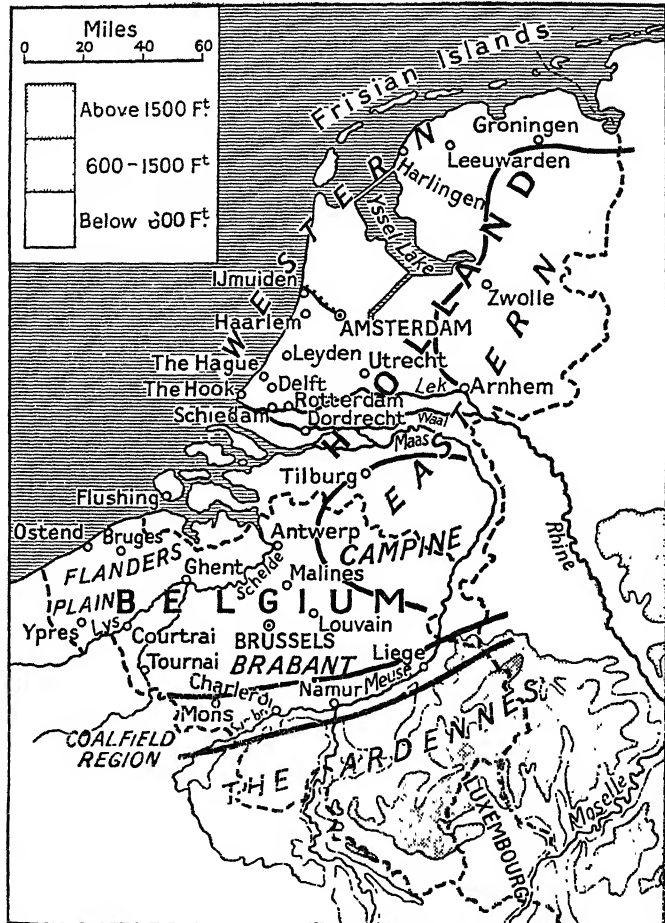


FIG. 327.—Belgium and Holland.

Two major polders not yet reclaimed are shown here as land.

Rhine and Meuse (or Maas). *Amsterdam* is the centre of the diamond-cutting industry. The two largest towns in Holland, *Amsterdam* and *Rotterdam*, are both ports. *Groningen* is the centre of the north-east of the country, and of a great butter-producing area. The making of straw-cardboard is an important industry near

here. The capital of Holland is Amsterdam, but the Royal Residence is at *The Hague* (s'-Gravenhage). University towns are Leiden (founded 1575), Utrecht (1636), Groningen (1614), and Amsterdam (1632). The country has long been famous for its art and learning. An industry widely distributed through Holland is the brewing of beer and the distilling of spirit (especially Hollands Gin, which is distilled from rye at Rotterdam and other centres). An important inland centre of trade is *Arnhem*, where artificial silk is made. *Haarlem* is the centre for the bulb-farming industry.

In foreign commerce Holland has stood in the front rank of nations from the very beginning of its separate existence. Among the facilities for foreign commerce the waterways, natural and artificial, have greater importance in Holland than in any other European country. The length of navigable rivers and canals is roughly double that of railways; canals for long were more important than roads. The Dutch are bold and intrepid sailors, as their early voyages of discovery proved long ago. Although a small mother country, Holland has a very large merchant fleet—1,600 sea-going vessels of over 4 million tons.

Holland has a large foreign trade. In addition there is a very large transit trade, for Holland forms the natural gateway to the whole of the Rhine Valley and the most important tracts of Germany.

The leading imports are textiles, cereals and flour, sugar, coffee and cocoa, iron and steel, coal, mineral oil, wood, and oil seeds, followed by other raw materials of various kinds. Apart from the transit trade, a considerable proportion of the imports are not intended for home consumption, but it is impossible to separate them in the statistics available.

The exports include dairy produce, vegetables and plants, meats, electric machinery, textiles and ships.

The greater part of the trade is with the nearby countries of Great Britain, Belgium, France, and Germany, but there is a large trade also with Indonesia and the United States.

The leading seaports of Holland are Amsterdam and Rotterdam, and immense sums of money have been spent to make them suitable for modern traffic. *Amsterdam* is connected with the North Sea, near the harbour of IJmuiden, by a deep ship canal (the North Sea Canal). *Rotterdam*, although well situated on the combined mouth of the Rhine and Maas (Meuse), is liable to be obstructed by the sediment brought down by these rivers. A great canal, the New Waterway, now connects Rotterdam directly with the North Sea, and ocean-going vessels reach the town at all states of the tide. The port, too, has greatly benefited by recent improvements in the navigation of the Rhine, since it is the natural key to the Rhine Valley. Ports have sprung up along the New Waterway, including *Vlaardingen*, now the third port of the Netherlands.

Smaller ports of Holland include the Hook of Holland and Flushing (both for passenger and mail traffic with England), Schiedam, Harlingen, Dordrecht, and Groningen.

BELGIUM

The kingdom of Belgium has an area of 11,750 square miles and is thus smaller than either Holland or Denmark. The population numbers over 9,000,000 with an average density of over 767 (1957)

The country is divisible into three distinct portions:

(a) In the south the Ardennes form a plateau of hard rocks, partly covered with valuable pine forests and partly with sheep pastures. It is thinly peopled; but in the south, where the hills are lower, is part of the rich iron field of Luxembourg.

(b) On the north is a country of low hills, devoted to agriculture. Near the coast the land is flat. Important crops are rye, oats, wheat, potatoes, and sugar-beet, from which sugar is made, and in the low-lying tracts, flax. Over two million cattle are also kept as well as pigs—over a million. In the east is the dry, sandy country of the Campine, covered mainly with useless heathland, but assuming now a new importance because of the underlying coalfield.

(c) Between the agricultural country of the north and the Ardennes in the south there is a long, narrow strip running right across the country from west to east, and occupied by a coalfield. This is the great manufacturing region of Belgium. Iron ores are brought from the south (Luxembourg), and there are many iron and steel works; zinc ore is obtained in the east, and is smelted near Liège. The chief coal towns are *Mons*, *Charleroi*, *Namur*, and *Liège*. The production of coal in 1931 was 27,000,000 tons and 30,000,000 in 1950; the normal production of iron is between 4 and 5 million tons and of steel the same. There are glass works and chemical factories at Charleroi, and chemical and railway works at Liège. The woollen industry is centred at Verviers. This region is very thickly populated.

Belgium is, in the main, an industrial country, and exports iron and steel bars, glass and glassware, cotton goods, flax and yarn, sugar, and zinc, as well as billets of wood from the Ardennes. Another important export is cut diamonds; the raw material from the Belgian Congo and Angola being cut at Antwerp.

The leading imports are food (grain, etc.) and raw materials (wool, cotton, hides, oil seeds, etc.). Belgium's trade is mainly with her neighbours (Great Britain, France, Netherlands, and Germany), and with the United States and the Belgian Congo. There is a large import of grain, etc., from Argentina.

The capital and largest city is *Brussels*, situated in a central

position and well served by railways. *Antwerp* is the largest port, but can only be reached from the sea through Dutch waters. Like Amsterdam and Rotterdam, Antwerp has a large transit trade in goods passing into Germany and a great rivalry exists between the Dutch and Belgian ports.

Antwerp is connected by first-class waterways with the Seine, Meuse, and by the fine Albert Canal with the Rhine.

Courtrai, *Tournai*, and *Ghent* are centres of the flax industry. Tournai has risen to importance because the waters of the River Lys are especially suitable for "retting" the flax. In modern times cottons have to some extent replaced linens, and Belgium has a high reputation for the quality of her cotton manufactures. The coast of Belgium is continually being added to by the sea. Sand-dunes are thrown up by the sea, and the marshland behind can be drained. Ypres, Bruges, and Ghent used to be ports, now they are far inland, though *Ghent* has a ship canal. It follows that the existing ports, of which the largest is *Ostend*, suffer much from being steadily silted up.

Belgium is well served by railways, and there are important waterways, including the River Meuse and the Sambre.

Luxembourg is a tiny state south of Belgium ruled by a Grand Duchess. It has valuable iron ores, which it sends to Belgium for smelting. Luxembourg is united with Belgium and the Netherlands for customs purposes in an "economic union" known as Benelux (Be-Ne-Lux).

SWITZERLAND

The little republic of Switzerland, situated right in the mountainous heart of Europe, has an area of 16,000 square miles and a population of over 5,100,000 (1957). Although five-sevenths of the country is mountainous and a half occupied by uninhabitable high mountains, the average density of nearly 300 is more than double that of Ireland. From a commercial point of view Switzerland is in some respects very remarkable. With little coal and little iron, it is yet pre-eminently a manufacturing country: manufactured goods form the bulk of its exports, raw materials and food the bulk of its imports.

Switzerland is divisible into three:

- (a) The southern half forms part of the main chain of the Alps and is very mountainous.
- (b) In the north is a small strip of the Jura Mountains.
- (c) Between the two lies the Swiss Plateau.

Most of the cultivated land is found in the Swiss Plateau, and there most of the people live. The country is not naturally very fertile, but the Swiss are industrious, and have used every inch which

can be used. The crops are the same as in neighbouring parts of France and Germany, but the moistness of the climate, due to the mountainous character of the country, causes Switzerland to be better adapted to pasture grasses than to the growing of food crops. Excluding waste land and forests, 80 per cent. of the land is devoted to cattle-rearing, 20 per cent. to agriculture. The most important occupation is thus dairy-farming, and Switzerland is famous for its cheese and condensed milk. In summer the cattle live on the grass on the mountain sides; in the cold weather, when the mountains are snow-covered, they are brought down to the valleys. The word "alp" means a mountain pasture. In the absence of coal, Switzerland has developed its water-power to the extent of nearly 4 million kilowatts. Nearly all of the railways have been electrified, and most of the factories are operated by electricity. Transport is expensive, and so Switzerland has specialized in the manufacture of objects requiring but small quantities of raw material but necessitating cheap skilled labour. Watches and clocks, for example, are made at *Neuchâtel* and *Geneva* and in the small towns of the Jura Mountains. Similarly, fine silk goods are made at *Zurich*, *Basel*, and *Bern*; fine cotton goods at *Zurich*; embroidery at *St. Gall*. Milk is tinned at *Vevey* and many other places. The making of all kinds of chocolate is a related industry. Other industries include the manufacture of hosiery, linens, boots and shoes. The reason for the development of the industry in electrical machinery is obvious. There is also now a large chemical industry.

The mountains of the Alpine Zone are very beautiful, and every year huge numbers of tourists visit Switzerland from all parts of Europe. They go in winter for winter sports, and in summer for the sheer enjoyment of mountain and lake scenery or for mountain-climbing. The tourists bring considerable wealth to the country and support the large numbers of hotels. Many of the valleys which face south are warm, and rendered warmer by the Föhn winds. The Föhn winds blow down from the mountains, the air being compressed and warmed by its rapid descent.

Switzerland imports raw materials (cotton, silk, and wool) as well as metals (especially iron and steel) and foodstuffs (wheat, sugar, and vegetables). The import of coal is considerable, also of coarser cotton manufactures. The exports are manufactured goods (fine cotton and silk goods, watches and clocks, and machinery), as well as cheese and tinned milk. The ports utilized by Switzerland are *Antwerp*, *Rotterdam*, *Havre*, *Marseilles*, and *Genoa*. The trade is principally with Germany, France, the United Kingdom, United States, and Italy.

Switzerland lies at the meeting-point of many routes. *Geneva* was largely for that reason made the headquarters of the old League of Nations. Two important railway tunnels pass through the Alps

from Switzerland—the Simplon and St. Gotthard. Two other important railway routes through the Alps are outside Switzerland—one to the west connects France and Italy (Mont Cenis Tunnel), the other to the east connects Austria and Italy (Brenner Pass).

AUSTRIA

The republic of Austria existed from 1918, after the First World War, until 1938 when it was absorbed into the German Reich. By May 1945 the whole of Austria had been occupied by the troops of the four powers and in July of that year was divided into four occupation zones—the north-eastern (Soviet), north-western (United States), western (France), and southern (Britain). Vienna is likewise in four sectors. Austria is only a little larger than Scotland, and has a population (7,000,000) less than that of Greater London. Austria shares with Switzerland the distinction of being almost entirely a mountainous country and there are many other points of comparison. A rough threefold division of the country is possible:

- (a) The eastern part of the Alpine system (the Austrian Tirol and a small part of the Dolomites) occupies three-quarters of the whole.
- (b) The valley of the Danube, the most important part of the country, is comparatively narrow and hilly. In the east, just where the Danube leaves the mountains and enters the Hungarian Plain, lies Vienna.
- (c) The hills to the north of the Danube lie along the Czechoslovakian border.

Even including Alpine pastures, less than half the whole is under crops and pasture, but more than a third of the whole is forested.

Austria has little or no good coal, but water-power has been developed from mountain streams.

Austria has also some important mineral deposits, comparatively little exploited—iron ore is the most important; copper ore, lead ore, and lignite are also mined and there is an oilfield near Vienna.

Two things result essentially from the geographical situation of Austria. From its central position and the attractive mountain scenery, Austria rivals Switzerland as a playground of Europe, and Austria has everything to gain from the further development of its tourist industry, of which *Innsbruck* is at present the leading centre. *Vienna* rivals Geneva as a meeting place of routes; when Vienna was the capital of the old empire, it was a very fine and flourishing city. Even now more than a quarter of all the people of the country live in Vienna. In the second place, Austria must, for the same reasons as Switzerland, concentrate on the manufacture and export of goods requiring a large amount of skill, and a comparatively

limited amount of raw material. This is exemplified in the manufacture of scientific instruments and electrical machinery, and the fact that a third of all the people are engaged in manufacturing. The principal urban centres in the valley of the Danube or its tributaries are Linz (machinery and textiles), Steyr (iron and steel works), and Salzburg.

HUNGARY

Before the First World War of 1914–18 the large central European Empire of Austria-Hungary was virtually ruled by the Austrians, a German-speaking people, from the great capital Vienna (Wien). The development of nationalism resulted in the disruption of the empire and the establishment of the new states of Austria, Hungary, Czechoslovakia, and Yugoslavia.



FIG. 328.—New countries carved out of the old Empire of Austria-Hungary in 1919.

The shaded area shows the extent of the old Empire; the boundaries of the new countries are shown as they were from 1919 to 1939.

In many respects Hungary is exactly the opposite of Austria. It is a little larger and has a few more people, but whereas Austria is almost entirely mountainous, Hungary is almost entirely a plain. The Plain of Hungary, running through the centre of which is the Danube, is shut in on all sides by mountains. As a result of the wall of mountains Hungary is cut off from the moderating influence of the sea and has a continental climate of marked extremes. The people of Hungary, the Magyars, are essentially agriculturists. In the Second World War Hungary joined Germany. On the defeat of Germany the country came under Russian influence; a republic of soviet type was established and the country became a satellite of the U.S.S.R.

The natural vegetation of the plain is steppe and there are few trees. But the natural grassland has almost disappeared. Some

of the soil is poor, especially in the north, and rye, oats, barley, and potatoes are the principal crops. But on the richer land farther south wheat and maize are the main crops, and the yield of good quality wheat is high. Sugar-beet, hemp, and flax are also grown. Many cattle are kept and fed upon fodder crops or corn, specially grown, and there are large numbers of sheep and pigs. The north shore of Lake Balaton is an important wine-producing area, but the best-known wines (Tokay) come from the hilly country in the north-east. Most of the industries of Hungary were connected with agriculture—flour-milling, sugar-making, and distilling—but later there was a marked increase in manufactures, notably of electrical machinery and apparatus, especially in Budapest. Hungary has deposits of good coal in the south-west near Pecs, and also deposits of lignite and extensive areas of bauxite, but has little or no iron or other minerals. There is, however, an iron and steel industry.

Budapest (1,060,000) the principal town, really consists of two towns, one on either side of the River Danube. It is situated just where the Danube passes through the only hill range in Hungary, and where the river can be bridged. *Szeged*, on the River Theiss (Tisa), is the largest town in the south of Hungary; *Debrecen*, to the east, is slightly smaller; *Miskolc* in the north-east also has 100,000.

CZECHOSLOVAKIA

Another country which arose in Europe as a result of the First World War was Czechoslovakia. It is a mountainous country with an area of 49,380 square miles—rather smaller than England—and a population of 12,500,000 (1949). The country consists of three parts:

(a) The Czech Plateau or Bohemia surrounded by mountains and sloping gently towards the north-west, *i.e.* towards Germany. The plateau is drained by the River Elbe and its tributaries the Moldau and Eger. The Elbe flows through a gap in the north and then through Germany.

(b) The valley of Moravia in the centre cuts the country in half. In the south the River March flows southwards and joins the Danube. In the north the River Oder cuts through the mountains by the Moravian gap and passes through Silesia to the Baltic. As this region includes a part of Silesia it is known politically as Moravia-Silesia.

(c) The mountainous mass of *Slovakia* in the east consists of the southern slopes of the Carpathians and the numerous mountain valleys, with fragments of the Hungarian Plain.

At the end of the Second World War, the country came under communist domination and became a satellite of the U.S.S.R.

The **Czech Plateau** has numerous rich coalfields, both of hard coal and lignite. Various minerals occur in the surrounding mountains. The broad valley-plain of the rivers which drain the plateau—the Moldau and the Elbe—have very rich alluvial soils and produce crops of very high quality. Potatoes, rye, and wheat form the staple food of the people, but hops are grown for brewing (Pilsener beer at Pilsen or Plzn) and sugar-beet for making sugar. Cotton-mills, glass and chemical factories have sprung up on the coalfields, whilst paper-mills, and saw-mills are found near the forested mountains where water-power is available. Iron ore is found

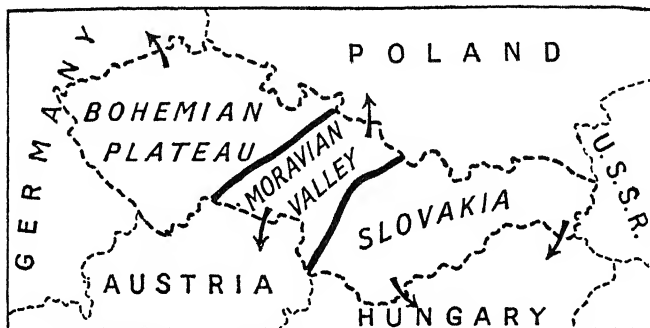


FIG. 329.—The natural regions of Czechoslovakia. The arrows show the natural outlets of each region. The Czech Plateau was formerly called the Plateau of Bohemia.

between *Praha* and *Pilsen*, and both these places have iron and steel works, whilst *Praha* (Prague or Prag), the capital, has manufactures of many kinds. In the higher and poorer parts of the plateau rye, oats, and barley take the place of wheat.

The **Moravian Lowlands** have also good agricultural lands where barley and sugar-beet are grown and, in the south, maize and fruits. But the lowlands have rich coalfields—in the north is a very small part of the Silesian coalfield, and there are other coal and lignite fields farther south. The coalfields have attracted manufactures—woollen goods and machinery are both made at Brno. The Moravian Lowlands have two outlets—one to the south through the river port of Bratislava on the Danube; one to the north through the Moravian gate.

The **Carpathians** are largely covered with valuable forests, and many places are rich in minerals. They require development. In the mountain valleys barley, sugar-beet, and potatoes are grown, whilst numerous cattle and sheep flourish on the mountain pastures.

Communications and Trade. Czechoslovakia is in an unfortunate

position regarding communications. Until recently there was no railway from one end of the country to another. The natural outlet of Bohemia is down the River Elbe through Germany to Hamburg. The outlet of Moravia is down the Oder to Stettin (Szczecin), or through Bratislava on the Danube. The railways from Bohemia and Moravia centre on Vienna in Austria, and those from Slovakia centre on the Hungarian capital of Budapest. Thus the trade of Czechoslovakia from the birth of the country has passed through many different countries and in many directions. Raw cotton and raw wool and other raw materials for Czech industries take the leading place among imports. Leading exports are cotton manufactures; woollen goods, cotton yarn, iron and iron manufactures, sugar, and glass-ware. Timber, coal, and lignite figure among the raw material exported. Since Czechoslovakia became a Russian satellite within the Iron Curtain the old extensive trade with Britain and the countries of western Europe has been largely replaced by trade with the U.S.S.R.

YUGOSLAVIA

Yugoslavia is another of the states which grew up after the First World War from the break-up of Austria-Hungary. The area is about 100,000 square miles, and the population 18,000,000—a density of 180 per square mile. It consists of:

- (a) The old kingdoms of Serbia and Montenegro;
- (b) Those southern parts of the old Empire which were inhabited mainly by Slavs—Bosnia, Herzegovina, Dalmatia, Croatia, and Slovenia.

Indeed the various parts of Yugoslavia differ greatly from one another in their natural features, their history and development and in the character of their inhabitants. Only racial affinity—Yugoslavia is the country of the southern Slavs surrounded entirely by alien races—and language unite the nation. The country became a republic in 1945 on a communist model. At first there was a close alliance with the U.S.S.R. but later Yugoslavia broke away.

The old divisions are roughly the natural regions into which the geographer would divide the country. These divisions are:

(a) *The Alps of the North* and the valleys which open out into the lowlands. This region, Slovenia, is very like the neighbouring parts of Austria, with its beautiful scenery, winter sports, and the fine lake resort of Bled; it shares in the tourist industry of Austria and Switzerland. The chief town is Ljubljana.

(b) *The Adriatic Coast and Dinaric Alps*. This region corresponds to the old province of Dalmatia and consists of limestone ranges

running parallel to the coast, which is fringed with numerous islands. The climate is Mediterranean, but over large areas the hills are dry and barren and the name of "karst" or "karstlands" is given to such limestone country where great underground channels have been formed by the action of water and where much of the drainage is below ground, leaving the surface dry. Crops, including the vine, can only be grown in certain places along the coast and in the more favoured valleys. The coast abounds in sheltered harbours, easily reached from the sea but cut off from the interior by the high ranges of mountains. Consequently the coastlands have been strongly influenced by Italy, from the head of the Adriatic Sea, and the coastal towns are very Italian in appearance. In the north the Yugoslavs built their own port of Susak, adjoining what was until the Second World War the Italian port of Fiume. Here is situated the much disputed country of the peninsula of Istria with a Slovenic countryside and Italianized towns. It passed (except Trieste) to Yugoslavia. In 1954 the Trieste territory was divided between Italy and Yugoslavia. Farther south are Split (formerly Spalato) and Dubrovnik (Ragusa) linked by road and rail through difficult mountain passes with the interior. Near the southern border of the country, Kotor (formerly Cattaro), in a wonderful bay, serves as the port for Cetinje, now Titograd after Marshal Tito, the capital of the former independent country of Montenegro, which is reached by a marvellous mountain road.

(c) *Bosnia and Herzegovina* lie amongst the mountains behind the Dalmation coast. This is wild, inaccessible country in which the people live in the valleys amongst the forest hills. Minerals are found in some areas; the chief town is *Sarajevo*, near the northern fringe. In this region many of the people are Mahommedans.

(d) *Croatia and the Northern Plain*. Traced eastwards and north-eastwards the mountains of Slovenia and the hills of Bosnia pass gradually into a country of lower hills with broader valleys and this in turn fades into the great Hungarian Plain, drained by the Danube and its great tributaries, the Sava and Drava. In the north is *Zagreb*, around which the agricultural land is in basins, but out on the plain (centre *Subotica*) is an almost unbroken stretch of wheat and maize with sugar-beet and tobacco.

(e) *Serbia or the Southern Region, including Macedonia*. This is again a hilly and mountainous tract, bounded on the north by the Danube. The land slopes, on the whole, northwards towards the Danube.

The hills are sometimes forested, at other times clothed with mountain pastures suitable for cattle and sheep. There are deposits of iron, and lead ores, and other minerals in places. But the most important parts of the region are the sheltered valleys, where wheat, maize, and fruits flourish. Large quantities of plums are grown and

dried for home use or for export as "prunes." They are also used in making a kind of brandy, the national drink of the Serbians. Other crops include the vine, sugar-beet, hemp, and tobacco. The capital, *Beograd* or *Belgrade*, lies near the junction of the Save with the Danube and between the northern plain and southern region. *Nish* commands the route to Salonika and Istanbul.

Communications and Foreign Trade. Yugoslavia is still essentially a primary producer. There is an export of timber from the forested southern hills, the remainder of the exports are mainly livestock and agricultural produce—maize, eggs, meat, pigs, cattle, wheat—and minerals. The imports are essentially manufactured goods—especially textiles—and some coal and oil. Wheat and flour may be imported in bad seasons.

ROUMANIA

Roumania is a country which nearly doubled its size after the First World War, and now includes a large part of the former Empire of Austria-Hungary. After the Second World War the rich plains of Bessarabia (Moldavia) were seized by the U.S.S.R. In 1947 King Michael abdicated and the country became a "People's Republic." The conventional English name is Roumania, the official spelling is Romania; another common spelling is now Rumania. It has an area of 91,670 square miles—roughly the size of Great Britain—and a population of 18,000,000.

Forming a great curve of mountains throughout the centre of the country and dividing it into two distinct halves, are the Carpathian Mountains and the Transylvanian Alps. Roumania is thus divisible into:

- (a) The Wallachian Plain—the valley of the Lower Danube which lies to the south of the mountains of the Transylvanian Alps.
- (b) The plateau to the east of the Carpathians.
- (c) The mountains which form a broad barrier through the country.
- (d) Transylvania and the Banat, on the west of the mountains, which consist of a mass of hills and sheltered valleys.

The Wallachian Plain has a continental climate with hot summers, cold winters, and a low rainfall, falling mainly in early summer. It is part of the steppe lands, and is now one of the great wheat lands of the world. Huge quantities of wheat, barley, and smaller quantities of maize are grown. *Bucharest*, the capital, lies in this region, *Galatz* and *Braila* are river ports on the Danube. Dobruja, the region south-east of the Danube, differs from the Wallachian Plain. Half of it is marshy and useless, the remainder is mainly pastoral

country, producing large quantities of wool. The port of the region is *Constanta* on the Black Sea, which is free from ice all the year. Many of the towns of the Wallachian Plain have developed industries connected with agriculture—flour-milling, brewing, distilling, and sugar-making.

The Plateau to the east of the mountains is a relatively poor area—the rich maize-growing plains of Bessarabia having been lost to Russia.

The Mountains are forested up to 5,000 feet, especially on the Transylvanian Alps. On the lower slopes are beech trees, on the higher parts soft-wooded coniferous trees grow. The logs are floated down the rivers to saw-mills at Galatz. Above the forests are summer pastures with large numbers of sheep.

In the foothills of the mountains, especially near Ploesti, are rich oilfields. Before the development of many modern fields, in the production of oil Roumania once ranked fourth among the countries of the world—as in 1933. The oil is refined at Ploesti and sent by pipe-line to Constanta.

Transylvania and the Banat have valuable mineral deposits—gold, silver, copper, lead, iron, and coal—as yet little developed. Many of the hills are wooded, forests covering 40 per cent. of the surface; large numbers of sheep are kept on the hill pastures, while cultivation is carried on in the valleys. Maize is the principal crop.

Roumania is essentially an agricultural country. Its principal exports are maize, barley, wheat, wheat-flour, timber, petroleum, and livestock; its imports are cotton and woollen goods, iron, steel, and machinery. As elsewhere industrialization is proceeding rapidly.

Before leaving Roumania, the difficulty of communication between one part of the country and another should be noted. The Danube is frozen in winter. It passes through the great gorge known as the Iron Gate, now made navigable, and thus cuts through the mountain barrier which separates the Hungarian Plain from Wallachia.

FRANCE

Position and Size. With the exception of the Soviet Union, the republic of France is now the largest country in Europe, a position occupied in 1914 by Austria-Hungary. The area is nearly 213,000 square miles, and the census population (1954) 42,774,000. The advantageous position of France is especially worthy of note. She has not only a long coastline along the Channel and the Atlantic, facing the North American continent, and thus sharing the advantages enjoyed by Great Britain for trans-Atlantic trade, but she has also an important length of coastline along the Mediterranean well situated for far Eastern trade. It may be argued that Spain also has these advantages, but whereas Spain is cut off from the rest of

Europe by a great mountain barrier, France adjoins on her eastern frontier some of the most populous and prosperous countries of Europe—Belgium, Germany, Switzerland, and Italy.

Physical Features. The west, north-west, and north of France—more than half the whole country—belong to the great European plain, and in many ways are comparable with the south-west, south, and south-east of England. The central plateau or “massif central” forms a very well-marked unit—a plateau with a high south-eastern and eastern edge forming the Cevennes. The surface slopes gently westwards and north-westwards, hence the main drainage is in these directions. The south-east of France is occupied by the Alps, which reach the coast in the Maritime Alps to form the beautiful Riviera coast. It is not always realized what a large proportion of the Alps actually lies in French territory. Between the Alps and the Cevennes lies the fertile Rhone Valley; between the Cevennes and the Mediterranean are tracts of lowland which form part of the Mediterranean region. Along the southern borders of France lie the Pyrenees; in the east of the country are the Vosges, separating the northern plainland from the rift valley of the Rhine.

The great rivers of France are important as navigable highways. One only drains to the Mediterranean—the Rhone—two to the Bay of Biscay—the Garonne and the Loire—whilst the Seine is the most important river flowing into the English Channel. France is one of the riverine nations of the Rhine and a considerable tract of north-eastern France drains into its tributary the Meuse.

Geology and Minerals. The geology of France is reflected to a remarkable degree in its relief. The Central Massif consists of an old stable block of crystalline rocks surrounded by a ring of limestone. Particular economic interest attaches to the small folds of coal-bearing Carboniferous and Permian strata which are pinched in amongst the older rocks and also to the areas of late volcanic rock which cover parts of the surface, especially in the Puy de Dôme district. The great fold range of the Pyrenees has a core of ancient crystalline rocks. The same is true, of course, of the Alps, but in the Alpine folds so well known in the Maritime Alps of France and the Riviera massive limestones predominate. The lowlands of the west and north of France fall geologically into three distinct parts. In the north-west is the Armorican massif of old rocks—sometimes called the Brittany massif, though it extends beyond the confines of Brittany—broadly comparable with the massifs of Cornubia and North Wales in England. Between the Armorican mass, the Central Plateau and the Pyrenees lies a broad basin of young sedimentary rocks—the Aquitaine Basin. Occupying the whole of the north of France is the Paris Basin, using that term in the widest sense. On the Belgian borders the Ardennes massif extends into France, whilst the great Belgian coalfield is continued through France, under a

cover of chalk and other rocks, to the shores of the Strait of Dover. Eastern France has the Jurassic iron ores of Lorraine, and includes a portion of the Rhine rift.

Broadly speaking, France is not richly endowed with minerals, but benefited from the restoration of Alsace-Lorraine which gave her the whole of the vast Lorraine iron ores and also the Alsatian potash deposits.

Coal. France possesses but a single large coalfield region—that of the north of the country, which is an extension of the Belgian field. In reality there are several basins, but they occur approximately in a line and may be considered together. The fields suffer from intense folding and much of the coal is powdered, just as it is in the Belgian fields. This area produces three-quarters of the coal of France. The only other fields in France are those already mentioned as lying amongst the old rocks of the Central Plateau. Those of St. Etienne, Creuzot, and Alais are the chief and have given rise to small industrial regions. France has also the Sarre coalfield—the Saar field of the Germans who held it from 1935 to 1945—which is now an autonomous region. Its output in the inter-war years was about 10,000,000 metric tons. France has insufficient coal for her requirements and is forced to import large quantities. Although the output is but small, special interest attaches to the mineral oil of Pechelbronn (Alsace), because the oil is obtained by mining the sands in which it occurs. In recent years extensive drilling has proved considerable oil in the south.

Mineral	Production—millions of metric tons		
	1925	1930	1952
Coal	47.1	53.9	55.4
Lignite	1.0	1.1	1.9
Iron ore	35.8	48.5	40.7
Salt	1.3	1.7	2.0
Alsace potash products . .	1.2	0.5	1.0
Lead, zinc, silver ores . .	0.03	—	—
Gold ores	0.06	—	—

Iron Ore. The one metallic mineral of which France has large quantities is iron ore. Apart from small quantities from Normandy and near Creuzot and in the Pyrenees, nearly the whole output is from the great Lorraine field. The ore is low grade, and it was not until processes were perfected whereby the content of phosphoric acid could be eliminated that the deposits could be utilized. Much of the ore is smelted in the Briey Basin near the source of the raw material; but ore is also sent by water to the northern coalfields. France is handicapped in her iron and steel industry by the paucity of coal.

The Alsace Potash deposits occur a little to the north-west of Mulhouse, and are second in importance only to those of Prussian Saxony. The production reached 1,350,000 metric tons, yielding 230,000 tons of potash in 1922 and to a yield of 312,000 tons of potash in 1925. In 1950 production after the war years had recovered to 1,018,000 tons.

Water Power. The small reserves of coal in France have acted as a spur in the development of hydro-electric power. The principal developed and potential regions are the French Alps and the Pyrenees, the Cevennes form a subsidiary region. In 1953 over 50 per cent. of the electric power was hydro-electric. It has been decided to electrify the whole of the French railway system and a considerable mileage—including the Midi Railway south of Bordeaux and part of the Paris-Orleans line—has already been done. In 1953 a tenth of the railway mileage had been electrified.

Climate. In addition to the advantages already mentioned which accrue to France from her position between the Atlantic and the Mediterranean are those due to the consequent variations in climate and products dependent thereon. In the lowlands of the north and west the climate is of the North-western European type; warmest in the south-west, colder and more continental in the north-east. Owing to the elevation, the climate of the Central Plateau is characterized by colder winters and may be deemed of the Central European type—the same is true of the east of France. The lowlands round the Mediterranean have a typical Mediterranean climate but it is difficult to say how far up the Rhone Valley the type extends. Lyons may be taken roughly as the limit, but the cold winter winds which blow down the funnel-like Rhone Valley and are responsible for the turbulent Gulf of Lyons—actually an unkindlier stretch of water than the famed Bay of Biscay—render the climate not typically Mediterranean.

The natural vegetation of France naturally varies widely with the climate. Out of a total area of the country of 138,000,000 acres 27.6 million acres are under forest; 14.8 million are moorland and uncultivated. The forests which thus cover 20 per cent. of France are a source of considerable national wealth, and are carefully controlled, and very large areas, especially south of Bordeaux on the "Landes," are actually plantations. Whilst much of the north and west is well wooded with deciduous trees, it is the pine forests of the higher land which are of the greatest importance. Some of the pine woods of the Mediterranean coast are valuable as sources of resin, which is obtained by tapping the trees in much the same way as rubber trees are tapped.

Agriculture. Out of 81 million acres under crops, fallow and grass in 1950, the arable land accounts for 50.2 millions. The following table shows the principal crops:

Crop	Acreage (millions)			Yield (million metric tons)		
	1925	1934	1950	1925	1934	1950
Wheat. . .	13.9	13.1	10.7	9.0	8.4	7.7
Rye . . .	2.1	1.7	1.3	1.1	0.8	0.6
Barley. . .	1.7	1.9	2.4	1.0	1.1	1.6
Oats . . .	8.6	8.1	5.8	4.8	4.1	3.3
Potatoes . .	3.6	3.4	2.5	15.2	16.0	12.9
Sugar-beet .	0.5	0.7	1.0	5.4	—	13.6
Vines . . .	3.5	3.5	3.9	1,500 ¹	1,093 ¹	1,433 ¹

¹ Millions of gallons.

Wheat. The importance of the French wheat crop is not always fully appreciated. France grows nearly a fifth of all the wheat produced in Europe outside Russia. Even so, the production is insufficient for home needs. Though wheat is widely grown for local markets throughout France, the Paris Basin is pre-eminently the wheat land of the country. The west tends to be somewhat too damp (compare Devon and Cornwall), the south-west is more suited to maize; the soil of the Central Plateau is too poor.

Rye becomes the staple grain on the poor soils of the Central Plateau and the east.

Oats grow mainly in the north and west; in the Mediterranean belt they almost disappear.

Maize, though not mentioned in the above table, is the great crop of the warm, damp south-east; it is almost absent from the regions of summer drought, whilst the north, like the neighbouring parts of England, is too cold.

Root crops, including potatoes and sugar-beet, are of first importance, especially in the agricultural lands of the Paris Basin.

The Vine, as shown in Fig. 330, is widely cultivated in France and is not restricted to the Mediterranean belt, which yields the largest production of unnamed *vin ordinaire*. Despite a total production averaging about 1,300,000,000 gallons, of which only between 20 and 22 million gallons (1950) are exported, France figures as a larger importer of wine—300 to 400 million gallons average (1949–50). The localization of production of the better-known types of wine in France is important—the clarets around Bordeaux; many white wines in the lower Loire Basin; champagne on the dry

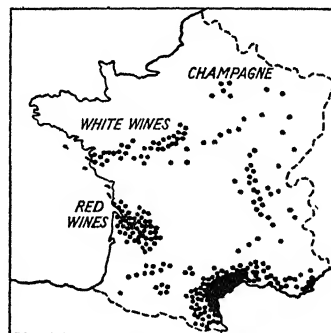


FIG. 330.—The vineyards of France.

Notice that most vineyards are found in the Mediterranean region. The northern coast is too cold for the vine and so is the central plateau.

chalk hills of the Champagne district in the east of the Paris Basin; and burgundies in the Côte d'Or.

Fruits of many kinds are widely grown—apples for cider in the north-west; various deciduous fruits in the Paris Basin. The olive is definitely restricted to the south-east, and, as usual, its distribution is really coincident with the Mediterranean type of climate.

Animals. There were in France, at the end of 1950, nearly 2·4 million horses; 15·7 million cattle; 7·5 million sheep; and 6·7 million pigs. Thus France has five times the number of horses, 50 per cent. more cattle and pigs than Great Britain, but less than half the number of sheep.

Cattle are especially numerous in the wet north-west (the American Massif) where butter-making is a very important industry; they are also numerous all over the north, in the Rhine country, among the Alpine pastures and on the northern borders of the Central Massif. In all these areas cheese and butter making are carried on, cheese becoming markedly more prominent in the south as butter is in the north. Cattle are very few in the Mediterranean region.

Sheep are most numerous on the Central Massif and on the dry chalk hills around the Paris Basin.

Sericulture is important in France, but is practically restricted to the Rhone Valley south of Lyons and adjoining regions.

Fisheries. France, like Spain, enjoys the advantage of fisheries in the Atlantic and the Mediterranean. The industry employs 70,000 fishermen with 8,000 sailing boats, 140 steamers and 13,500 motor boats. The two great fishing grounds are off the coasts of the north-west (pilchards, sardines, etc.), and in the Mediterranean (tunny).

Manufactures. One consequence of the wide dispersal of the French coalfields is the fact that the localization of the great manufacturing industries is governed more by the position of local supplies of raw material and the conveniences of obtaining supplies from abroad and marketing the product than by the supply of fuel.

The *iron* industry grew up at Creuzot, but great centres are now on the Lorraine iron fields (Briey Basin) and the northern coalfield. Of the important *textile* manufactures, silk is concentrated in the Rhone Valley, where it was originally dependent on local supplies of raw material, and is carried on at Lyons, St. Etienne, Avignon, and Nîmes; cottons are very important in Alsace (especially Mulhouse), and in the towns of the Vosges, as well as on the northern coalfields (Lille, Roubaix, etc.), and at Rouen. Woollens are concentrated in the north, where are the principal supplies of native wool and where lie the ports of Havre, Rouen, and Dunkirk, importing Plate wool. Paris, like London, is associated with a wide variety of manufactures, but particularly with luxury goods and clothing. Among other French manufactures may be mentioned

porcelain, earthenware (Paris, Limoges), glass (northern coalfield), and watches (French Jura).

Communications. A distinctive feature of the internal communications of France is the extensive use made of waterways. A large network of canals exists in the north and north-east, so that most of the large towns, such as Metz, Nancy, Sedan, Arras, Lille, etc., are in direct communication by first-class waterways (at least 6½ feet deep) with the great ports of Dunkirk and Antwerp. The extensive French railway system centres on Paris.

Ports. France has about half a dozen great ports. Marseilles occupies the leading position, since it has nearly all the Mediterranean and Far Eastern trade, and benefited enormously by the opening of the Suez Canal. It is also connected with the Rhone by a deep-water canal. Its local industries, such as the refining of

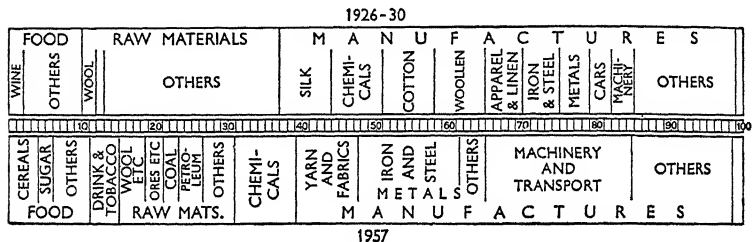


FIG. 331.—The exports of France.

oil and the making of soap, dependent originally on the local supply of olive oil, have expanded very largely. Havre and Rouen share much of the American trade of France (importing cotton, wheat, wool, coffee, etc.), and are the ports of Paris, but have a great rival in Dunkirk. The latter has risen rapidly; being conveniently situated for the northern coalfield, it imports the raw material required by the manufacturing towns of that area—notably wool—and exports their finished products. Bordeaux is the wine-exporting port; Cherbourg occupies the same position as Southampton does in England, as a port of call for trans-Atlantic liners; La Rochelle and Nantes with their outports conclude the list of large French ports.

Foreign Trade. About three-fourths of the exports of France are manufactured goods; nearly four-fifths of the imports are food-stuffs and raw materials. The unique feature of the export trade is the high value of wearing apparel; the large import of coal emphasizes one of the great weaknesses of France's general position.

NATURAL REGIONS OF FRANCE

Northern France. Northern France corresponds broadly with the Paris Basin, used in its widest sense. It does, however, include also (1) a small fragment around the great port of Dunkirk of the maritime plain of Flanders described under Belgium; (2) a fragment of the old massif of the Ardennes, also described under Belgium; and in the east (3) portions of the massifs bordering the Rhone. Eliminating these border tracts, the Paris Basin may be likened to

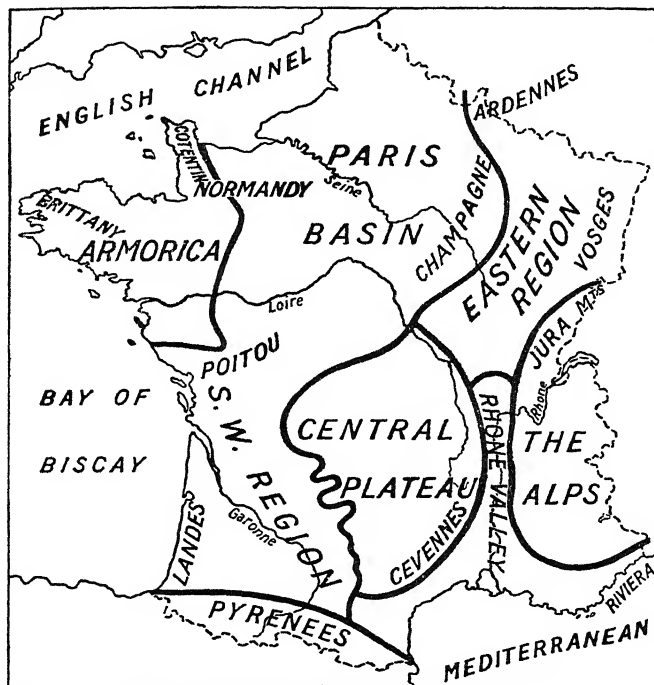


FIG. 332.—The natural regions of France.

graduated saucers, one inside the other, the smallest in the centre. In the centre are beds of sands, clays, and marls in very varied and alternating sequence, of Tertiary age. Some of the sandy tracts are of little use for agriculture and give rise to forested tracts; on the other hand, some of the clayey or marly beds afford ideal agricultural land. A group of limestones—only 90 or 100 feet thick, but very important—form the well-known calcaire grossier of the Paris Basin, and not only afford excellent building stone but produce a series of marked scarps where cut through by river valleys, thus affording the characteristic scenery of the heart of the basin. Surrounding the

Tertiary beds is a broad ring of chalk, cropping out in the downs of Artois, Picardy, Champagne "pouilleuse," and Normandy. Surrounding the chalk is a ring mainly of Jurassic rocks, beyond which are the ancient massifs which surround the basin. The great rivers of the north of France have cut up the Paris Basin into a series of "blocks" of country which have received distinctive names from the French. The varied geology thus affords striking contrasts within the basin between these different "pays." There are the chalk plains of Picardy with their covering of fertile "loess" (or

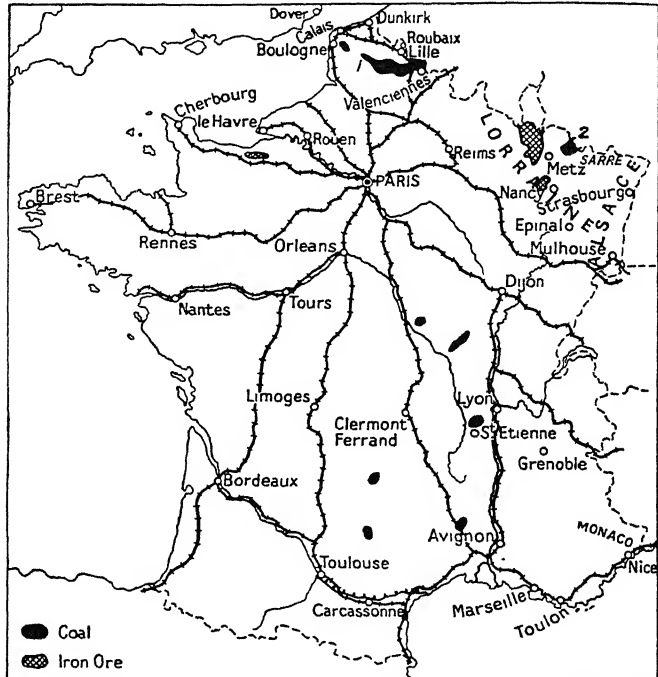


FIG. 333.—The coalfields, railways, and chief towns of France. 1 = The northern coalfield; 2 = The Sarre coalfield.

limon of the French), the bare chalk hills of Artois; the fertile valleys of Soissonais; the forested plateau of Brie; the treeless limestone plateau of Beauce, all affording startling contrasts. The contrasts are even more marked than in the scarplands of south-eastern England, and this must be borne constantly in mind in any attempt to generalize on the Paris Basin. Broadly speaking, however, the Paris Basin is the great agricultural region of France, wheat, barley, and root crops being of first importance, with sheep on the drier hills, cattle in the damper areas. In the centre lies Paris, to the north-west its great ports of Rouen and Havre; to the north lies the

great industrial region of France, the presence of which is determined by the coalfield which underlies the chalk hills. The great coalfield towns include Lille, Roubaix, Tourcoing, Valenciennes, Arras, and others; the port of Dunkirk is the main outlet, Calais and Boulogne serving mainly for cross-Channel traffic.

The Armorican Massif. This area of old rocks in which the dominant folds have an east-and-west (or "Armorican") trend occupies the province of Brittany and western Normandy. The region is broadly comparable with Devon and Cornwall on the opposite side of the Channel. Much of the ground is too infertile or too exposed to the prevailing westerlies for cultivation, and the life of the region centres in the valleys. Too damp for wheat, the leading cereals are oats, barley, and rye; orchards of apples, pears, and plums are numerous. As in Devonshire, large quantities of cider are made from the apples, and there is an export trade in fruit. The orchards in many areas serve also as small corn fields; near the coast and towns market gardening predominates. Cattle are numerous in the valleys; sheep thrive on the hill pastures and gave rise at an early stage to the textile industries of Rennes and Leval. The former town, as a result of the early impetus of the woollen industry, is now one of the leading cotton manufacturing towns of France. Fishing is important round the coasts, and the conditions which have made the fishermen of Cornwall famous in history have made the men of Brittany their rivals in this regard. The kinship of the Welsh, Cornish, and Bretons brings the analogy between the English and French Armorican area even closer.

South-Western France. Lying between the Armorican Massif on the north, the Central Plateau on the east and the Pyrenees on the south, is a broad lowland region, floored very largely by Tertiary rocks of the Basin of Aquitaine. In the north is the lower Loire basin, centring on Nantes and where Poitou forms the transitional area between the Central Massif and Brittany, the Paris Basin, and the Aquitaine Basin. Farther south one passes into maize-growing country and into the great red-wine region of Aquitaine, centring on the town of Bordeaux and the lower Garonne. To the south of Bordeaux lies a large and remarkable tract of country—the Landes. Formerly a waste of dangerous shifting sand-dunes which threatened the fertile land to the east, this is now one vast plantation of pines, covering hundreds of square miles.

The Central Plateau. The ancient rocks of this central massif furnish but a poor soil, so that, despite a good rainfall, rye and sheep are the dominant notes in the agriculture. The life of the region, on the whole sparsely populated, centres on the little coalfields and the industrial towns such as Creuzot, St. Etienne, Alais, and Clermont Ferrand which have resulted therefrom, or on the volcanic soils of the Puy de Dôme district and Cantal in the region long

known as the Auvergne where the volcanic soils of the valleys are rich. The high south-eastern edge well marks the limit of the Mediterranean *régime*. The waters of the plateau drain towards the north-west, and it is with the north-west of France that the climate—much more severe—of the central plateau is linked. The region is large, it covers a sixth of the whole of France. Limoges is a leading town and a centre of the north-west of the plateau.

The Pyrenees. The succession of chains which constitutes the Pyrenees forms a remarkably complete barrier between France and the Iberian peninsula. Many of the higher parts of the mountains are covered with treeless hill pastures tenanted in summer by herds of sheep and by cows. The valley slopes are forested with pines and oaks and other trees; whilst in the valleys nestle little villages surrounded by their fields of maize and barley. Formerly neighbouring valleys were cut off from one another to a remarkable degree—an isolation reflected in sudden changes in domestic architecture, but the isolation has now largely been destroyed by the ubiquitous motor 'bus. At the foot of the Pyrenees lies an extensive plain—the subpyrenean plain—which forms the transition area to the Aquitaine Basin on the west, stretches to the edge of the central plateau in the centre and fades into the Mediterranean lowlands on the east. In recent years an intensive search has resulted in the discovery of small quantities of oil. The plain is built up of huge quantities of material washed down from the mountains, and the rivers render cultivation difficult by their sudden floods. Toulouse and Carcassonne guard the gap which separates the Aquitaine Basin from the Mediterranean lowlands.

The Rhone Valley and Mediterranean France. The valley of the Rhone and its principal tributary the Saône lies between the Burgundian Heights (or the Côte d'Or) and the Cevennes in the west and the Jura and Alps on the east, and forms a "couloir" which has been of the greatest importance throughout history. It is to-day the great line of communication between Northern France and the Mediterranean; a fertile, picturesque valley where the firs and beeches of the north give place to the cypresses and olives of the south. Aspect is of importance in the valley; the vineyards of Burgundy are on southward facing slopes. The silk-manufacturing town of Lyons—no longer dependent upon the limited local supplies of raw silk—is the focus of the northern part of the valley and its growth has been assisted by the near-by coalfield of St. Etienne. West of the mouths of the Rhone lies an important wine and olive country, but to the east the Riviera finds its main economic importance in its fame as a winter resort. It should be noted that Marseilles is not on the mouth of the Rhone but lies in a mountain-girt bay to the east, hence the importance of canal communication with the Rhone. Marseilles has a very large trade

with India and the East, importing linseed, sesamum, ground-nuts, and copra for her oil and soap factories. The great shipping trade of Marseilles has caused the development of shipbuilding industries. East of Marseilles is the naval station of Toulon. The great centres of the French Riviera are Cannes and Nice. Farther east Monte Carlo lies on a small peninsula in the tiny principality of Monaco.

The French Alps. The great mass of the Alps which lies in French territory is penetrated by transverse valleys which have acted as avenues of penetration and have allowed the people and the life of the plains to penetrate far into the mountain mass. Grenoble is the outstanding example of a large town in the heart of the Alps. On the other hand, there are the "high valleys" of the Alps with their little villages of alpine pastoralists so different in character and isolated from the outside world. The important hydro-electric installations of the Alps have already been noted.

Alsace-Lorraine and the East of France. Geographically the east of France may be grouped as a whole as the "Rhine Region," but it really comprises at least three units—the portion of the Rhine valley which lies in Alsace; the forested Vosges and Basses Vosges; the Lorraine plateau which lies to the west of the Vosges. The rich plains of Alsace centre on Strasbourg and Mulhouse, and with their busy agricultural population afford an interesting contrast to the great mass of the Vosges, a block of forested, granitic country but sparsely inhabited. The Lorraine plateau with its great iron ore deposits might be considered the outermost ring of the Paris Basin, since it consists largely of Jurassic deposits matching those on the far western side of the basin. The valley of the upper Meuse which lies west of the plateau may be held more probably to bound the Paris Basin. Amongst the towns of Lorraine, Nancy and Epinal may be noted as textile centres originally dependent on local wool supplies and benefiting from the pure water supplies from the Vosges.

Corsica. Corsica is a mountainous island nearly half the size of Wales, famous as the birthplace of Napoleon. As in many mountainous islands, the population is found mainly round the coasts, so that Ajaccio is the chief port as well as the chief town. With the development of roads, the island, with its fine scenery, is sharing the popularity of the Riviera as a holiday resort.

SPAIN AND PORTUGAL

Position. The Iberian Peninsula, comprising the republic of Spain, the republic of Portugal, and the tiny British possession of Gibraltar, has an area of 228,000 square miles and a population of 38,000,000. Lying between latitudes 36° and 44°, nearly the whole is in the "Mediterranean Belt" excepting only the northern strip. Portugal occupies a compact block of the west coast with an area

of 34,000 square miles, but it will be convenient to consider first the peninsula as a whole.

Physical Features. The heart of the peninsula consists of a great plateau, the meseta, for the most part between 2,000 and 3,000 feet above sea-level. The plateau is bounded on the north-west by the mountains of the old massif of Galicia and on the north by the Cantabrian Mountains, which are continued eastwards into the Pyrenees. The Sierra Morena forms the southern limit of the meseta and running obliquely across its centre is the Central Dividing System. To the north-east of the meseta lies the deep trough forming the Ebro Valley. To the south of the meseta is another trough, occupied by the Guadalquivir Valley, which is separated from the Mediterranean by the fold range of the Sierra Nevada. The Douro, the Tagus, and the Guadiana have broad valleys in the lower courses in Portugal, so that on the west the edge of the great plateau is less clearly defined.

Geology and Minerals. Broadly speaking, the Iberian plateau consists of a stable block of ancient rocks, partly covered with younger sediments, against which the Pyrenean-Cantabrian system was folded on the north and the Sierra Nevada or the Penibetic system (a continuation of the Atlas) was folded on the south. The position of the two great valley regions, the Ebro Valley and the Guadalquivir Valley, is determined mainly by two tectonic troughs. The Iberian peninsula has considerable though not fully developed resources in metallic ores, especially in the northern fold ranges (the Cantabrians); the southern fold ranges (the Sierra Nevada), and the southern fringe of the plateau (the Sierra Morena). Taking Spain alone, in 1950 no less than 250,000 persons were employed in connection with the mining and metallurgical industries of whom 153,000 worked in mines.

Mineral	Quantity in metric tons		
	1925	1933	1950
Coal	5,800,000	5,430,000	9,400,000
Anthracite	320,000	570,000	1,468,000
Lignite	400,000	300,000	1,344,000
Lead ore	210,000	110,000	45,400
Copper ore	3,700,000	700,000	304,000
Iron ore	4,500,000	3,390,000	3,013,000
Zinc ore	170,000	90,000	119,200
Mercury	22,600	10,000	1,790
Sulphur	—	50,000	38,300
Potash salts	—	—	1,039,000
Iron pyrites	—	—	1,320,000

Other mineral products include salt, manganese, tin ore, and phosphorite. The output of cement reached a total of 2½ million tons

in 1950. Most of the coal is mined in the north, the great centre being Oviedo, but there are also important mines in the south, in the Sierra Morena of Cordoba province and in the Guadalquivir Valley. The lead is mainly from the south, from the Sierra Nevada and Sierra Morena; the big production of copper almost entirely from the western end of the Sierra Morena in the hinterland of Huelva. Many parts of Spain are rich in iron ore, but the principal workings are in the north (Santander and Oviedo) and in the south along the Sierra Nevada. The zinc, also, is from the north (Santander) and south (Granada). Spain's important output of mercury came until recently from the famous mines of Almaden in the south-western corner of New Castile.

Portugal is, by comparison with Spain, less richly endowed with mineral wealth. Coal is scarce and the want of fuel handicaps the exploitation of the wolfram, iron, copper, manganese, and other minerals which do exist.

Climate and Vegetation. There is marked distinction between Northern Spain, which has a north-west European type of climate with a good rainfall well distributed throughout the year, and the remainder of the peninsula, which belongs as a whole to the Mediterranean region. It is true, however, that the Central Mountain Divide, by virtue of its elevation, attracts a higher rainfall, and is to a considerable extent covered with forests comparable with those of the northern mountains, so that it is regarded by some as an "outlier" of the north-west European type of climate. The northern part of the meseta may be regarded as transitional in type between North-west European and Mediterranean.

Quite apart from this distinction there is the broad twofold division of the peninsula into the northern and western "pluviose" portion, and the central, southern, and eastern "arid" portion. Although the rainfall *régime* of most of the plateau is Mediterranean, *i.e.* there is a rainfall maximum in winter and a dry summer, the elevation results in winters too cold for typical Mediterranean vegetation—for example, citrus fruits are absent. Hence the vegetation of much of the high interior is best described as dry steppe land. Forests are important in the northern mountains of Spain, and in Portugal cork from the cork oak forests is one of the great sources of wealth. Resinous pine trees are important in Spain.

Agriculture. Spain is a predominantly agricultural country. More than 90 per cent. of the surface is classed as "productive," although only 45 can be classed as under production. In Portugal 27 per cent. is forested, including no less than 8 per cent. under cork oaks, 26 per cent. under crops (excluding 3½ per cent. under vines), and 4 per cent. under fruit trees.

The leading crops of Spain (in order of area) are wheat, olives, vines, barley, rye, oats, maize, fruits, peas and beans, and rice.

The distribution of these crops is influenced in a remarkable way by the climate. Most of the wheat and barley is grown on the plateau (especially the northern meseta) and the Mediterranean coastlands, and there is very little in the wetter parts of the north and west. The maize, on the other hand, is almost entirely restricted to the wet north-west; the rye to the poor, dry soils of the north-western part of the plateau. Rice grows in certain sheltered irrigated tracts along the Mediterranean coast and to a smaller extent in Portugal. Citrus fruits are limited to the southern, eastern, and part of the western coastlands. The olive grows, in addition, over most of the plateau. The annual production of red and white wines is very large (600–800 million gallons), the largest production being from the Tarragona and Barcelona areas. Wines of the sherry type (taking their name from an English corruption of Jerez, near Cadiz) are from the south-west; ports from the lower Douro basin in Portugal (shipped through Oporto). The drying of fruits is concentrated along the Mediterranean coast, the principal region also for sericulture.

The localization of animals in the Iberian peninsula is remarkable. Spain has 4·2 million cattle, and Portugal 0·97 million, they are concentrated in the moist regions of the north and west. Spain has 26 million sheep and 7·2 million goats (1950)—Portugal has 3·9 million sheep, and 1·2 million goats (1940); they are nearly all to be found on the dry regions of the plateau. Reference must be made to the seasonal movements of sheep and shepherds from the winter pastures on the plateau to the highland summer pastures amongst the mountains. Pigs are more widely distributed (5·7 million in Spain, 1·1 million in Portugal).

Fisheries. The fisheries of Spain employ about 130,000 of the population, the weight of the catch in 1949 being 550,000 tons—mostly sardines, tunny fish, and cod. The canning and preserving factories alone turn out products to the weight of nearly 100,000 tons. Portugal has also important fisheries, centring on Setubal. The north-western coasts of Spain rank first, followed by the Mediterranean coasts.

Population. Spain, with a population of 29,000,000, and Portugal, with 9,000,000, are both somewhat thinly populated. The density in Spain (1957) is 151; in Portugal (1957) about 252. It is interesting to notice that population, development, and towns are all concentrated in the regions surrounding the central plateau—the “dry heart” of the peninsula. Of the 26 towns, 24 in Spain and two in Portugal, with a population of over 100,000 in 1950, most are ports, and only one with more than 200,000—the capital of Spain—lies on the plateau.

Manufactures. Spain cannot be described as a manufacturing country, though she now has important manufactures of cotton

goods, mainly around Barcelona, of woollen goods and of paper, (from the esparto grass of the plateau). Other industries include glass-making, flour-milling, fish-canning.

Communications. The Douro and Tagus are both navigable through Portuguese territory to the Spanish border; the Guadal-

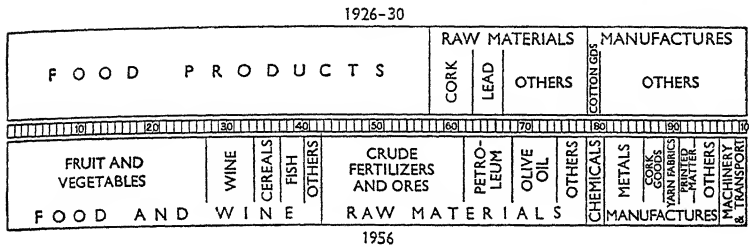


FIG. 335.—The imports of Spain.

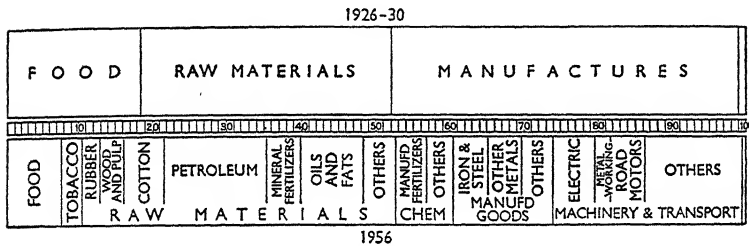


FIG. 334.—The exports of Spain.

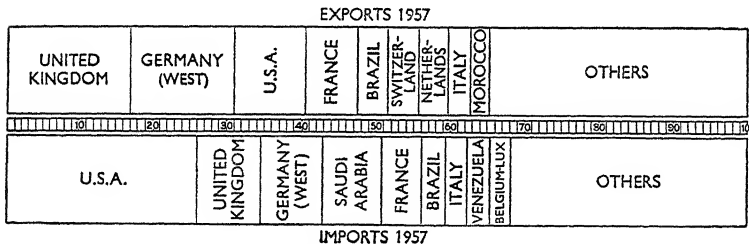


FIG. 336.—The direction of Spanish foreign trade.

quivir by ocean-going steamers to Seville, and by other craft to Cordoba; and the Ebro beyond Zaragossa. Otherwise the railways form the principal means of communication. There are 13,500 miles of railway, mostly on the gauge of 5 feet 5½ inches.

Foreign Trade of Spain. It will be noticed from the diagrams that the export trade of Spain consists mainly of foodstuffs—wine, fruits, etc.—and raw materials, especially metals. The imports show a decreasing proportion of manufactured goods.

NATURAL REGIONS OF SPAIN

Northern Spain. Northern Spain comprises broadly that part of the peninsula which has the North-west European type of climate. Though hilly or mountainous throughout, it is one of the important parts of Spain, and the fertile valleys are among the most densely populated. The whole area may be divided at once into three subdivisions:

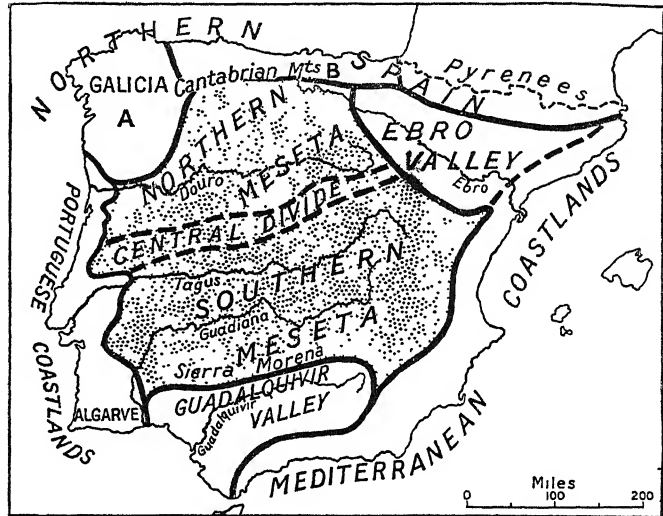


FIG. 337.—The natural regions of Spain and Portugal.

The Galician Massif, including the plateau region of Portugal which lies north of the Douro River, in many ways recalls the Brittany Massif of France. Poor, granitic soils do not encourage agriculture, but the rainy equable climate gives a natural vegetation of meadow and deciduous forest. Cattle and maize are the keynotes of the region, the drowned coast with its “rias” is the great fishing ground of Spain.

The Cantabrian Mountains include the great coal and iron region of Spain. Oviedo is the coal town; Santander, by virtue of fairly easy access to the interior, serves as the northern port of Madrid. The mountains are lower to the east (Basque mountains), where there are more opportunities for agriculture and general development which has been aided by the energy of the Basque people. Bilbao and San Sebastian lie in this area.

The Pyrenees are higher than the Cantabrians. The water power resources have been utilized towards the east, but less so than in

France. About $4\frac{1}{2}$ million horse-power is actually developed in Spain; the Pyrenees, followed by the Cantabrians, are the leading regions. In particular the River Segre, a tributary of the Ebro, has been utilized.

The Meseta. The great central plateau also falls roughly into three divisions:

The Northern Meseta corresponds roughly with the upper Douro Basin, lying in the provinces of Leon and Old Castile, and hence sometimes called the basin of Old Castile. This is, *par excellence*, the wheat region of Spain, centred round the milling town of Valladolid. Too cold in winter for the olive and the Mediterranean fruits, too arid for the forests of the north-west, it is a "transition region."

The Central Dividing Ranges are forested (though now largely cleared), and in this respect resemble the Cantabrians.

The Southern Meseta corresponds roughly with the basins of the upper Tagus and Guadiana, including the "basin of New Castile." It is a region of poor heathlands not always sufficiently moist to furnish even winter sheep pastures. The capital lies in the northern part of the New Castile Basin, Toledo towards its centre. Forests of the typical Mediterranean oaks, though stunted, cover some of the area, and the olive is found over most of the region.

The Guadalquivir Valley. This valley lies between the edge of the meseta (the Sierra Morena) and the Sierra Nevada or the Andalusian Cordillera, and corresponds with the Andalusian trough. In this warm, sheltered region of Southern Spain, Mediterranean fruits flourish; the very name of Seville is ineradicably associated with oranges as that of Jerez (near Cadiz) is with sherry. Granada lies in the heart of the Andalusian mountains.

The Mediterranean Coastland. This long strip consists actually of a number of isolated tracts of cultivable land, backed by high mountains and separated by spurs of upland. The whole region is sunny but very dry, lying as it does in the lee of the plateau. It is along the Mediterranean coastland that irrigation assumes a paramount importance; on the terraced hillsides are fruit gardens, on the alluvial flats at the mouths of the rivers an intricate system of channels and pipes irrigates the huertas and vegas. A huerta has normally two harvests a year, a vega only one. In the huertas an elaborate system of crop rotation is practised, wheat, maize, beans, hemp, are among the leading crops; the vegas are largely devoted to fruit trees. The vines and olives are mainly on the higher, drier grounds; in the dampest parts near the lagoons, banked in by coastal sand-dunes, rice is grown. The towns have grown up as natural centres of the more important areas: Malaga and Almeria in the south, where Moorish influence is marked in many ways—not least in the architecture of the flat-roofed houses. Farther north

Cartagena, Alicante, and Valencia are all in tracts celebrated for their fruits. North of the Ebro mouth the climate is moister, and Tarragona and Barcelona are centres of the great wine-producing region of Spain, whilst Barcelona rivals Marseilles on the other side of the Gulf of Lyons as an industrial centre—with cotton, woollen, machinery, and other manufactures.

Murcia is the only inland centre of note.

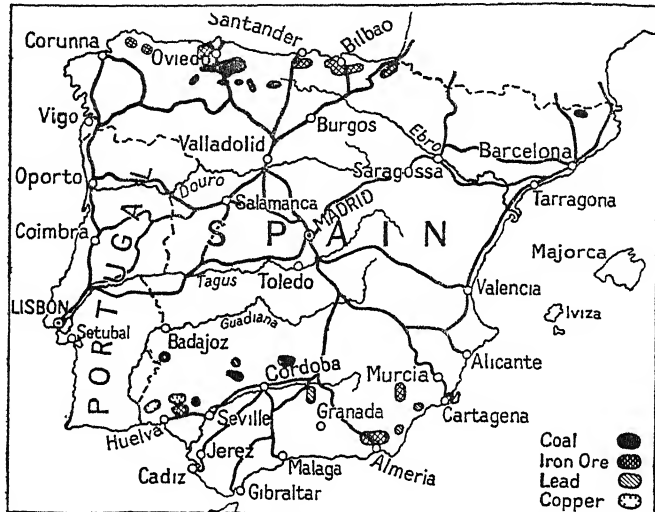


FIG. 338.—Minerals, towns, and railways of Spain and Portugal.

The Ebro Basin. This depression is cut off from the Mediterranean coastlands by the Catalanian hills, and though Mediterranean in climate, is slightly more continental. Large tracts are irrigated, and a variety of crops grown. The valley centres on the old bridge town of Saragossa or Zaragoza.

PORTUGAL

In many ways the cultural background of Portugal, with its long association with Britain, is very different from that of Spain. There are many other contrasts between the two countries. Portugal comprises the following regions: (a) A *northern plateau* which has already been mentioned as comparable with Spanish Galicia. (b) A hilly, well wooded *north central* region, north of the Tagus, with an adequate rainfall, a land largely farmed by small farmers from isolated farms or scattered villages. Here maize is the grain of the wetter, lower lands; rye of the hills; acorns from the oak forests provide food for pigs. The vine is largely cultivated and wine made for local use, but the famous Port wine area is the dry sheltered

middle Douro valley. The vines are grown on terraces in the gorge-like valleys and the wine shipped from Oporto, Portugal's second town. (c) A gently rolling steppe-like country with nucleate hill-top villages (originally for protection against the Moors) with huge stretches occupied by wheat, barley, and other crops. The climate is

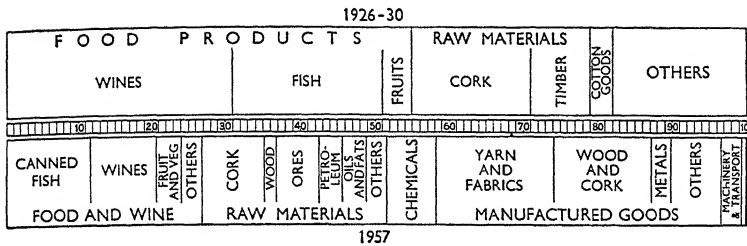


FIG. 339.—The exports of Portugal.

drier and of distinctly Mediterranean type, and donkeys or asses replace the universally used oxen of the north. There are extensive cork-oak forests, and some olive groves. (d) The *southern Sierra* or mountains separate the last region from (e) the *Algarve*, a narrow strip along Portugal's southern coast with a climate and products like those of north Africa.

It should be noted that Lisbon is not only a fine city and port, but is centrally placed in relation to the regions of the country.

GIBRALTAR

Gibraltar, the "Key to the Mediterranean," has been a British possession since 1704. Its position at the eastern end of the Strait

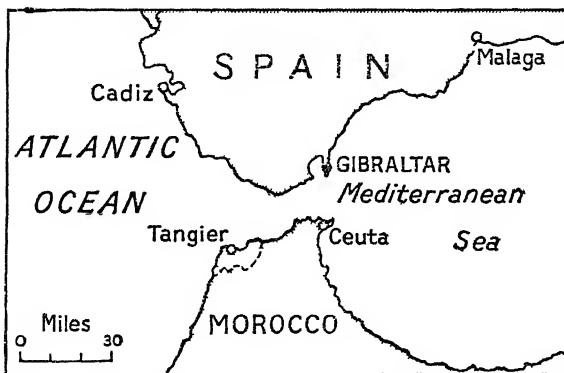


FIG. 340.—The position of Gibraltar—the key to the Mediterranean.

of Gibraltar (here 16 miles wide; at its narrowest 8 miles) should be carefully noted. The town is built on the western side of a small

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rocky peninsula, the Rock of Gibraltar, and is a strongly fortified naval station. It is also a free port and a coaling station, and to the west of the Bay of Algeciras forms a larger harbour.

In the open Atlantic, nearly a thousand miles west of Lisbon, lie the Azores, under the dominion of Portugal, whilst five hundred miles south-west of Lisbon is the Portuguese island of Madeira. The Spanish Canary Islands, nearer the coast of Africa, are in the same latitude (roughly 28°) as the northern part of the Sahara. Both Madeira and the Canaries combine the sunny skies of the southern Mediterranean or even the Sahara with the advantages of a comparatively equable oceanic climate and are favourite winter resorts.

ITALY

Italy, with an area of 116,000 square miles, is slightly smaller than the British Isles, and, with a population of about 48,000,000, every where the average density is high. Italy was a Kingdom until 1946 when it became a republic. In the inter-war years the destinies of the country were in the hands of the dictator Benito Mussolini and in the Second World War Italy joined Germany; she was invaded by the Allies and defeated in 1945 and lost her colonies. She was later entrusted by the United Nations with the administration of Italian Somaliland.

The natural limits of the country are well defined; by the Alps on the north and by the sea on all other sides. There are, in the presence of a high mountain wall and a great northern plain (the Plain of Lombardy) and a hilly peninsula to the south, some points of general resemblance to India. The Apennines form the backbone of peninsular Italy; it should be noticed that they lie very close to the sea in the north-west; swing across to the east coast, and then return to the south-west to pass through the "toe" of Italy into Sicily. The climatic variations in Italy depend largely upon the topography, and so the principal physical regions are also climatically distinct. Italy may be divided primarily into:

- (a) The southern slopes of the Alps in the north.
- (b) The great plain of Lombardy or the plain of the Po.
- (c) Peninsular Italy, in which several subdivisions may be distinguished.

Most of Peninsular Italy has a typical Mediterranean climate, but the plain of Lombardy is cut off from the influence of the Mediterranean by the Apennines, and has very cold winters, with a spring or early summer rainfall maximum.

The Italian Slopes of the Alps face towards the south and towards the sun, and are thus warmer than they would otherwise be. This

is particularly so as many of the valleys run north-and-south and open out southwards. Some of the valleys are partially blocked at the southern end, giving rise to the beautiful Italian lakes, visited annually by thousands of tourists. These warm, Alpine valleys are, in fact, oases of Mediterranean vegetation, where such fruits as the olive and vine flourish. The Alps give place somewhat abruptly to the plains, and along the borders are many towns using electric power obtained from the swift Alpine streams.

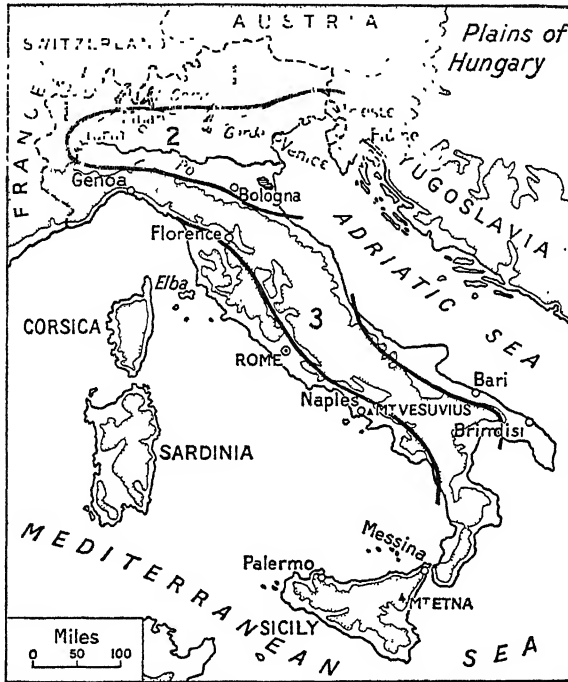


FIG. 341.—The natural regions of Italy.

Land over 1,000 feet, dotted. 1. The Alpine slopes; 2. The Plain of Lombardy; 3. Peninsular Italy.

The Plain of the Po is the most fertile part of Italy, and supports nearly half the population. The plain is hemmed in on all sides by mountains, except towards the east. Formerly a gulf of the Adriatic, its surface has been built up by the enormous quantity of silt brought down by the Alpine streams. It is interesting to notice that the Po itself lies towards the south; the result of the greater swiftness of the tributaries coming from the north. In the east the plain is low-lying and subject to floods; less so in the west, though everywhere there is a tendency for the rivers to silt up their beds so that

the water-level between the embankments is often above the level of the surrounding plain. The whole is a great agricultural area; wheat, maize, and rice are the leading cereals. This is the leading rice-growing area of Europe, the rice being grown under irrigation in the west and around the delta in the east. Cattle-rearing and dairy-farming (including the production of cheese) are important industries, and great use is made of the pasture lands of the encircling limestone hills. Mulberry trees grow throughout the plain and have led to this region becoming one of the great silk-producing areas of the world. Silk-spinning is carried on in Como, Milan,

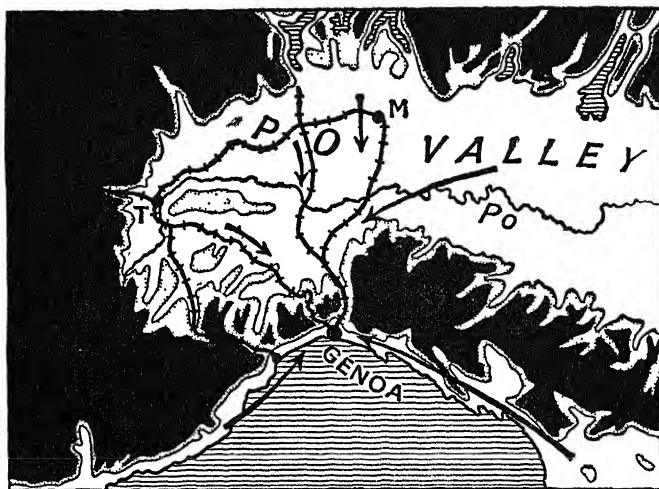


FIG. 342.—The position of Genoa.

Notice the gap to the north of the town, followed by the railway to M. (Milan). The smaller town to the west of Genoa is Savona. Notice the gap leading to T. (Turin). The arrows show the railway routes along the coasts and from the Po Valley. Land above 1,500 feet, black

and Bergamo; silk-weaving is centred at Milan which vies with Lyons as the premier silk-manufacturing centre of Europe. The supply of cheap hydro-electric power more than compensates for the absence of coal, and together with the supplies of cheap, skilled labour, has attracted other industries to the towns of the northern plain. Cotton and woollen goods are manufactured, the cotton being imported from the United States and the East, and cotton goods take an important place in Italian exports. There are also hemp and jute factories, the home production of hemp being an important branch of Italian agriculture.

Milan is the nodal point for the western portion of the plain. It is the natural junction of the east-west routes with the north-south routes and several trans-Alpine railways converge on Milan. It is only natural that it should have railway workshops and heavy

industries. *Turin* commands the Monte Cenis route, and its modern automobile industry is the modern descendant of the old carriage-repairing and smithy's business of such a route town. The historic town of *Venice* would appear from a casual glance at the map to be the natural outlet of the plain, but it has been supplanted in this respect by Genoa, across an important pass in the Apennines. *Verona* and *Padua* are two other towns of the northern group; *Bologna* is the collecting centre of the south-east of the Plain. *Trieste* which, after the Second World War became a "Free Territory," is naturally an outlet for Central Europe (see p. 532). It was restored to Italy in 1954.

Peninsular Italy is divided by the Apennines into an eastern and a western portion. Actually, it is convenient to consider five sub-regions—the Northern, Central, and Southern Apennines; the Western Coast, and the Eastern Coast.

The Northern Apennines in the north-west are continuous with the Maritime Alps. The mountains drop sharply to the sea and there is no coastal plain along the Italian Riviera. The Altare and Bocchetta passes have determined respectively the positions of Savona and Genoa, and the latter has permitted Genoa to serve as the main outlet of the Po Basin. Favourable lower slopes permit the growth of Mediterranean fruits; characteristic oak-chestnut forests cover other slopes. The marble of Carrara is world famous.

The Central Apennines are broader than the northern, and comprise a large stretch of barren inhospitable limestone country with a karst type of scenery.

The Southern Apennines are again narrower and include many volcanic areas.

The Western Coast cannot be described as a coastal plain, but consists of a tangled mass of volcanic hills, isolated peaks, and plains. The rainfall is heavy, being exposed to the full force of the westerlies. Formerly the low lands were marshy and malarious but the swamps have now been very largely drained. Much of the volcanic soil is highly fertile, especially around Naples, maize and wheat being the leading cereals with the vine and olive tree also of great importance. *Rome*, at the old head of navigation on the Tiber, is the political capital of the country, as well as the seat of the Vatican. In 1929 the Vatican State was returned to independence. It covers an area of 109 acres with the great Cathedral of St. Peter and the Papal residence. *Naples* has developed into a great industrial city. There is an abundant supply of labour and the development of industries—notably textiles, sugar-refining, and motor-engineering—has been carefully fostered by local authorities. *Leghorn* is the other great centre and port of the Western Coast. The famous iron ores of Elba are smelted on the coast of the mainland near by. *Florence* is an old seat of learning and art.

The *Eastern Coast* is narrow except in the south, where it merges into the peninsula of Apulia. The east coast is drier than the west.

The Island of *Sicily* is famous for its fruit, particularly lemons, and silk; its largest town, Palermo, carries on iron-smelting; Messina took many years to recover from its destruction by earthquake in 1908. Sulphur from the volcanic regions is a noteworthy product. The island of *Sardinia* has rich mineral deposits, but is still largely undeveloped.

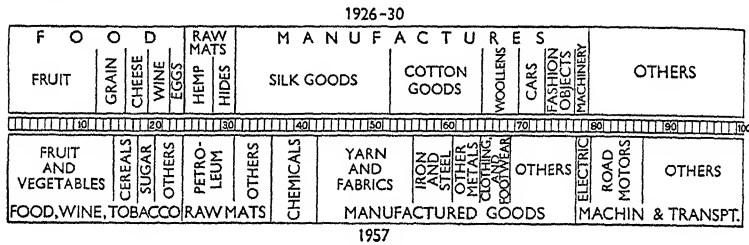


FIG. 343.—The exports to Italy.

Most of the "others" in this diagram are manufactures which make up two-thirds of the whole.

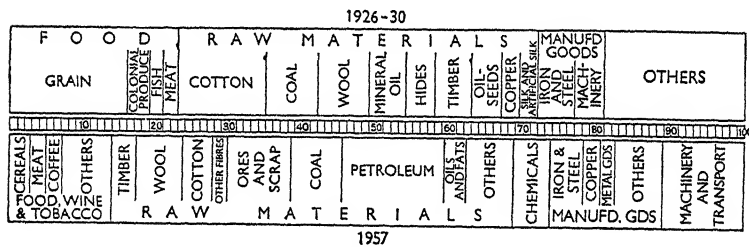


FIG. 344.—The imports of Italy.

Most of the "others" in this diagram are foodstuffs and raw materials which make up three-quarters of the whole

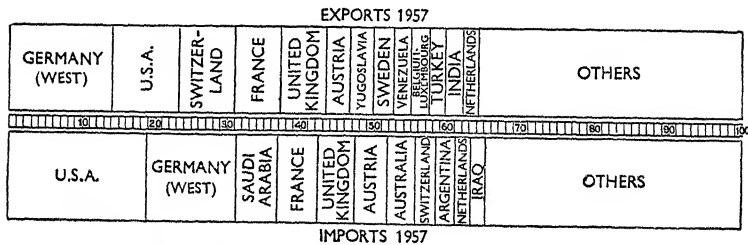


FIG. 345.—The direction of Italy's foreign trade.

Australia should be added as an important supplier of foodstuffs.

Communications of Italy. The directions followed by the railways are determined very largely by the mountain chains. The convergence of trans-Alpine routes on the northern plain should be

carefully noted. Among navigable waterways only the Po and certain of its tributaries are of importance.

Population. Italy is, broadly speaking, over-populated. Poverty is widespread and the standard of living is low. Consequently large numbers of Italians emigrate, formerly to North America, now especially to European countries and to South America. In the years 1901–1913 the annual number of emigrants exceeded 600,000; in 1930–1933 it was about 180,000. Even in the inter-war years the Italians could not emigrate to their own colonies to any great extent, for Italy's only possessions until the annexation of Abyssinia in 1936 were three areas in Africa, largely desert. These were Libya, Eritrea, and Somaliland. Now Italy has only Italian Somaliland (Somalia) under trusteeship until independence in 1961. Thus over 10,000,000 Italians live in foreign countries.

In the years following the Second World War numbers of emigrants again reached large numbers—nearly 200,000 in 1948 and in each of the subsequent years.

Foreign Trade. The unfavourable balance of trade is noteworthy. Among the imports the high place taken by wheat indicates the shortage of food; the large import of raw cotton bears witness to the expansion of the cotton manufacturing trade, the cotton is mainly from the United States and India. Italy's import of coal comes especially from Germany. Among exports the high place occupied by silk and cotton goods is noteworthy.

MALTA

Between Sicily and the nearest point of Africa lie the two islands of Malta and Gozo. With the tiny island of Comino the total area is 122 square miles. Just as Gibraltar is the key of the Mediterranean, these islands are the key to the route between the eastern and western parts of the Mediterranean. They have been British since 1814. The islands are dry and rather barren, and may suffer badly from the dry Sirocco wind from the Sahara. The land is very carefully cultivated by terracing and, where possible, by irrigation; but enough food cannot be grown for the 300,000 inhabitants, and much has to be imported. The importance of the islands is in their position—on one of the great trade routes of the world. Malta has a fine harbour (at Valetta) long used as a naval base, now for ship repairing.

THE BALKAN PENINSULA

The third peninsula projecting into the Mediterranean basin from the continent of Europe is the Balkan Peninsula. Unlike Iberia and Italy, it is joined on to Europe by a very broad isthmus, and it is difficult to say where the peninsula actually begins. Nearly the whole is mountainous, and the chief areas suitable for human

settlement are small, often isolated coastal tracts and some of the larger river valleys. The complex physiography is in the main responsible for two outstanding features of human life in the peninsula:

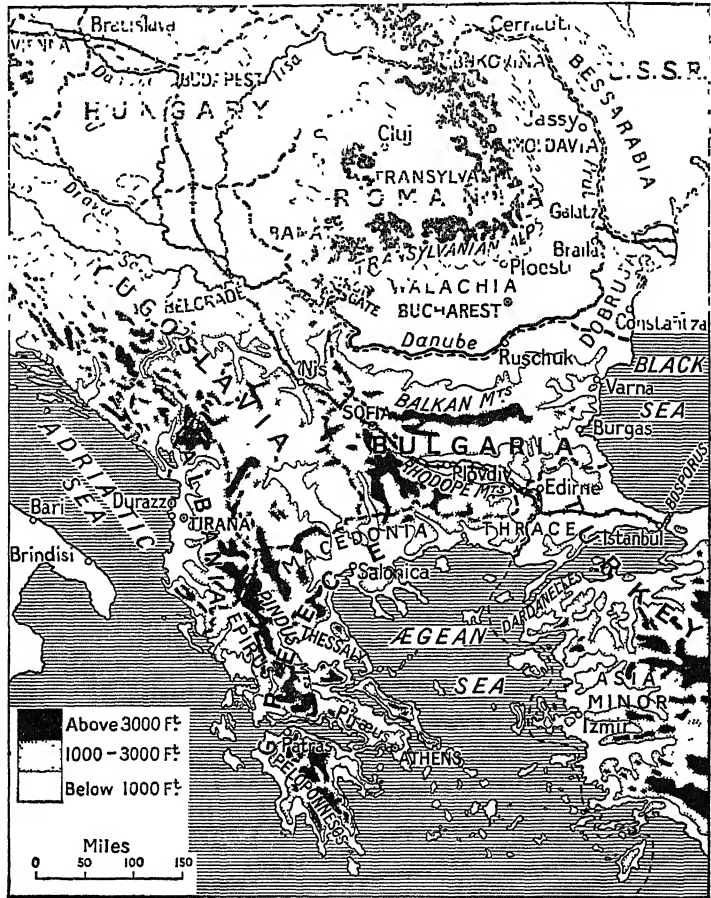


FIG. 346.—The Balkans.

The heavy black lines show the main mountain divides.

(a) The rise, from the time of the early Greeks onwards, of "city states," each corresponding with a fertile area surrounded by barren mountains and grouped around a central city as the hub of the human life of the whole.

(b) The persistence in the remoter mountain areas of peoples more primitive in culture and customs than anywhere else in Europe. The Albanians are still, or were until very recently, organized as

hill tribes under a chieftain (organized on this basis they took part in the First World War), and until 1925 had no railways, no money, and no banks.

The structure of the peninsula is also responsible for the division of the whole into two climatic belts:

(a) The coastal fringe, where the climate is of the Eastern Mediterranean type with very hot, dry summers, and winters which are distinctly cold (Athens 47° F. in January, Salonika 41° F.).

(b) The mountainous area, which may be linked climatically with central Europe.

As a result of the Balkan wars and two World Wars, political frontiers in the Balkan peninsula have been greatly changed even within the present century. If we define the peninsula as the mountainous area lying to the south of the Save-Danube lowlands, a large part of the north-west (the former Serbia and Montenegro) lies in the republic of Yugoslavia; the north-east constitutes Bulgaria; Albania is an independent unit in the west, European Turkey in the east; whilst Greece occupies the whole of the south.

In the whole peninsula there are few rivers of importance for navigation, and the irregularity of the surface presents great difficulty in the construction of roads and railways. Indeed, from Belgrade (at the junction of the Save and Danube) no railway penetrates westwards to the Adriatic; only one (to Salonika and Athens) to the south coast and the Mediterranean shores, and only one south-eastwards to Istanbul. Moreover, population over the whole peninsula is scanty and development is thus further hindered.

GREECE

Greece or the Kingdom of Hellas includes the most typically Mediterranean portion of the Balkan peninsula. Its present boundaries embrace an area of 51,000 square miles and a population of over 8 millions (compare England 51,000; 42,000,000). Reference has already been made to the concentration of the population in more or less isolated coastal plains. The "outlook" of the Greeks has always been towards the sea—the race home of the Hellenes of old was the coastal land of the Ægean Sea rather than the fringe of the peninsula. Pressure at home drove the Greeks to the sea for the conquest of lands overseas; to-day pressure at home results in extensive emigration. The large merchant navy and carrying trade of the Greeks again reflects the geographical environment; indeed, until 1916 there was no railway connection with any foreign country, so that foreign trade was essentially with the maritime countries of the world.

Greece really consists of three parts:

- (a) The northern portion, stretching from the Adriatic Sea, across the Balkan Peninsula, and round the Ægean Sea. Along the Ægean Sea are the plains of Thessaly, Macedonia, and Thrace separated by mountain spurs.
- (b) The southern portion, the peninsula of Morea with an isthmus so narrow that it has been cut across by a canal only four miles long (the Corinth Canal).
- (c) The archipelago and the large island of Crete.

Greece is so mountainous that only one-fifth can be cultivated. Most of the mountains are dry limestone ridges, often nearly bare, but forests cover them where conditions are better, as on the west of the main hills. The climate is typically Mediterranean, but Greece suffers from a rather low rainfall. This makes cultivation difficult, for there is little water available for irrigation. Most of the cultivation is carried on, and most of the people live, on the small tracts of alluvium. Some of these tracts are marshy and unhealthy until scientifically drained. The principal grains are wheat, barley, and maize, but Greece is particularly famous for its fruits. The staple exports are tobacco, sultanas and currants—the dried fruit of a vine with very small grapes. Most of the currants comes from the west coast around Patras. Olives are abundant; nuts are grown in large quantity, and so are figs, oranges, and lemons. Tobacco is another big crop. Cotton can also be grown. There are many sheep in the northern regions, and wool is produced. Of the mineral deposits in Greece, those of iron, lead, and magnesite are most important. Greece is mainly an agricultural country, and the industries depend directly on the products of the soil. The principal industries are the preparation of olive oil, wine, cheese, leather, and soap.

The long and wonderful history of Greece is largely the result of its situation, almost between Europe and Asia near the ways which carried the traffic between those continents. Remains of ancient cities are scattered over the country and render it of great interest. The capital, *Athens*, has been a famous city for more than four thousand years. Its population has increased between 1920 and 1930 from 300,000 to 700,000, owing to the settlement of Greeks compulsorily transferred from Asia Minor (especially Izmir). One result is that Turkey carpet making is now an important industry. By 1951 Athens with its port Piræus had become the largest city in the eastern Mediterranean, with 1,368,000 people. The long coastline of Greece has numerous good harbours. A notable and inevitable port is *Salonica*, through which passes much of the trade of Yugoslavia, which country has now treaty rights to a certain area called the Serbian port. The ancient city of Athens has the modern

port of *Piræus* close by, which has a fine natural harbour, and is the fourth port of the Mediterranean. *Patras* is the currant port. *Candia* is the principal town of Crete. The principal exports of Greece are tobacco and currants, other fruits, and olive oil—more than four-fifths of the total. The imports include grain, sugar, and other foodstuffs and manufactures. A large proportion of the trade is with the United Kingdom and the United States, Italy, France, and Germany.

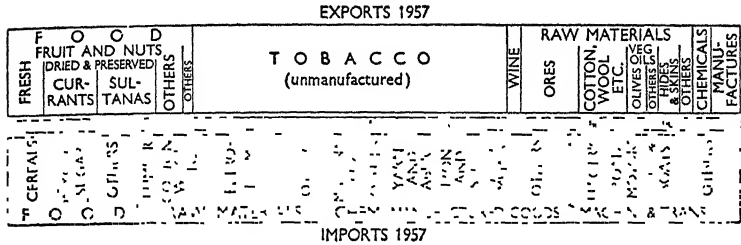


FIG. 347.—The trade of Greece.

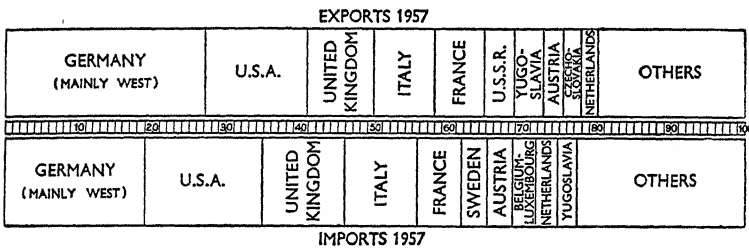


FIG. 348.—The direction of the foreign trade of Greece.

The important inland town of Adrianople, the natural centre of the lower part of the Maritza basin, was for a short time after the First World War placed under Greece, but afterwards restored to Turkey. It is now known as Edirne.

ALBANIA

Albania is a rugged territory, about one-half larger than Wales, lying to the north-west of Greece and inhabited by a people quite distinct from the rest of the population of the peninsula, and who have nearly always maintained virtual independence. In many ways Albania is the most primitive part of Europe. There are natural harbours along the coast, but communication with the interior is the great difficulty (compare the Dalmatian coast of Yugoslavia). The country became a kingdom under one of the old hereditary

chieftains, and in close alliance with Italy. The Italians constructed a number of roads in the south, and played a leading part in opening up the country until the outbreak of war. But, broadly speaking, each Albanian family cultivates simply to supply its own needs, and most areas of the country remain uncultivated. The coastlands are the more fertile parts. Albania is now a republic on communist lines.

BULGARIA

The small and mountainous country of Bulgaria, with an area of 43,000 square miles and a population of 8 millions, though bounded on the north by the Danube is more correctly considered a purely Balkan country than one of the "Danube lands." The monarchy was replaced by a communist republic in 1946.

Bulgaria falls into four parts:

- (a) The Danubian Foreland on the north;
- (b) The Balkan Mountains;
- (c) The Valley of the Maritza;
- (d) The Rhodope Mountains.

The *northern* or *Danubian tracts* are mainly composed of irregular limestone tablelands cut by deep and narrow valleys. The surface has an arid appearance with no rich pastures nor forest tracts except in depressions. These are, however, the great cereal lands of Bulgaria where wheat, maize, sunflowers (grown for the oil which is expressed from the seeds), and, more recently, sugar-beet are the principal crops.

The *Balkan Mountains*, though containing fine forests of beech and oak (wherein pigs feed) and conifers, are full of clearings and rich in valleys surrounded by fields of barley, rye, buckwheat, and potatoes, as well as fine meadows. Sheep and goats are kept on the mountain pastures. In the south, in the upper valley of the Tunja, are the famous rose gardens of Kazanlık, which produce, or used to produce, the costly perfume known as attar, or otto, of roses. Vineyards and orchards are found on the lower slopes of the mountains, above the lower levels where cold, stagnant air favours frost.

The *Maritza basin* divides naturally into two parts; the west, around *Plovdiv*, where even rice and cotton are grown, as well as hemp and cereals; the east, more undulating, which is another great wheat land (in the hinterland of the port of Burgas).

The *Rhodope Mountains* of the south are mostly densely forested, but in the west, in the Struma valley region, the famous Macedonian tobacco is grown; and in the east, in the Aida valley, mulberry trees are grown and silkworms reared.

Four-fifths of the people of Bulgaria (mostly Bulgarians) live in the country; two-thirds of the total population depend entirely on agriculture, but cultivation is primitive.

Sofia, the capital, is the largest town. Notice its important strategic position on the main railway route between western and central Europe and Asia Minor. *Philippopolis* (Plovdiv) is the centre of a rich agricultural region and an important junction on the old Orient Express Route. *Ruschuk* is a river port on the Danube; *Varna* and *Burgas* are the chief Black Sea ports.

After the Second World War Bulgaria came under Russian influence and, as a Russian satellite, is behind the iron curtain. Consequently through rail communication between Turkey and Western Europe is *via Salonika*—a tortuous route.

Bulgaria exports tobacco, cereals (maize and wheat), and eggs, and imports cotton and woollen goods, machinery, and metals.

EXAMINATION QUESTIONS

Selected from papers set by various examining bodies at examinations for the Advanced Level of the General Certificate of Education, Higher School Certificate, and University Intermediate.

1. Give a reasoned account of the industries of Switzerland.
2. Describe the course of the Danube and its chief tributaries in relation to the relief of Central Europe.
3. Select any three of the following ports and discuss their position and the nature of their trade: Barcelona, Naples, Genoa, Marseilles.
4. Divide France into natural regions, giving a short description of each region.
5. Describe and account for the distribution of population in Norway.
6. Give a geographical account of the Elbe basin.
7. Give a reasoned account of the main resources of Switzerland, and of the occupations of the inhabitants.
8. Name *four* important trans-Alpine railway routes, and give some account of any *two* of them, indicating the areas served and the characters of the traffic carried by each.
9. Compare the relief of the Iberian and Balkan peninsulas, showing in each case the relation between the relief and the main lines of communication.
10. Give a geographical description of the Basin of the Severn.
11. Discuss the distribution and the importance of the coalfields of Germany.
12. Give a concise account of the general geography of Holland.
13. Give geographical reasons for the limitations of the foreign trade of *either* Switzerland *or* Czechoslovakia.
14. Describe the course of the Rhine and discuss the significance of its valley as a traffic route.
15. Consider the trade outlets of *either* Poland *or* Yugoslavia.
16. Compare the natural resources of the United States of North America and the British Isles. Show how the extent of these resources has influenced the foreign policy of these two nations.
17. Indicate the importance of coal in the external commerce of Great Britain.
18. Account for the present economic position of any *two* of the following:—Sheffield, the Tyneside, Nottingham, Preston.
19. "In eastern England geographical factors have largely determined that

agriculture should be the dominant activity during many centuries." Discuss this statement.

20. Divide Scotland into its major climatic regions, describing the climate of each.

21. Discuss the geographical advantages possessed by the iron-smelting industry around the Tees estuary.

22. Analyse carefully with the aid of sketch-maps the position and historical development of *three* of the following towns: Copenhagen, Berlin, Madrid, Istanbul.

23. Compare the value for export of coal as regards position and access to the sea of the coalfields of Great Britain.

24. Give a brief account of the coal and iron resources of France and of Germany, and examine the relative opportunities of these two countries for the development of metallurgical industries on a large scale.

25. Analyse carefully the position and indicate the importance of *four* of the following: Salonika, Dijon, Lisbon, Madrid, Burgas, Memel, Fiume.

26. Discuss the economic potentialities of Yugoslavia.

27. Trace the interdependence of physical factors and agricultural production in Holland.

28. Give an account of *either* the Rhine *or* the Danube as (a) an avenue of commerce, (b) a potential or actual political boundary.

29. Compare and explain the agricultural production of France and Germany.

30. Compare and contrast the relief, climate, and agricultural products of the Po Valley and Wallachian Roumania.

31. Describe the geography of Poland, with special reference to (a) its economic life, (b) its political stability.

32. Contrast the part played by climate in the economic life of (a) Great Britain, (b) Sweden, (c) Italy.

33. Divide France into its major structural regions. Trace as fully as you can the influence of the geological structure and physical history of *one* of these regions upon its relief and drainage.

34. Give some account of the influence of climate on human occupations in different parts of Great Britain.

35. Examine the conditions and prospects of beet cultivation in the British Isles.

36. "France is the natural intermediary between the Mediterranean Lands and Northern Europe." Discuss the geographical basis of this assertion.

37. Describe and explain the climatic transitions which occur in Europe from west to east near the latitude of London.

38. Describe and account for the general distribution of population in *either* the Scandinavian *or* the Iberian Peninsula.

39. Write a brief geographical account of *either* the London basin *or* Scotland north of the Highland line.

40. Describe in relation to both physical and human geography the western border of the U.S.S.R.

41. What are the chief geographical advantages and disadvantages of Czechoslovakia for the development of large scale manufacturing industries?

42. Compare Denmark and Ireland in respect of their economic geography.

43. Give a careful account of *one* of the following pairs of ports, discussing the influence of position in each case: (a) Hull and Manchester, (b) Genoa and Venice, (c) Antwerp and Rotterdam.

44. Write brief notes on the geography of *four* of the following: Albania, the Brenner Pass, Trieste, the Saar Basin.

45. Give an account of the climatic conditions of *either* Scandinavia *or* the Hungarian Plain, indicating the causes and consequences of these conditions.

46. Describe the relief and structure of the Balkan Peninsula, and trace concisely the effect of these on lines of communication.

47. Analyse the geographic conditions affecting the economic development of *either* (a) Holland, *or* (b) Northern Ireland.

48. Discuss the geographical factors in the development of *two* of the following: (a) Cologne, (b) Bordeaux, (c) Glasgow, (d) Danzig.

49. Give an account of the cotton manufacturing industry in France, com-

paring the advantages (geographic and economic) of the different districts engaged in it.

50. Give an account of the geographical factors favourable to the dense population and the industrial developments on the Plain of Lombardy.

51. Write a brief essay on the English Channel.

52. Describe the location and characteristic features of the English coalfields north of Yorkshire and Lancashire. How does their location influence the utilization of their coal?

53. Give a summary account of the distribution of the woollen industry in Great Britain; and discuss more fully the geographical advantages of its principal centre.

54. "In western Europe all geographical factors combine to ensure variety of product and facility of commercial intercourse." Discuss this statement.

55. "Germany has no natural focusing point." Describe the major geographical divisions of Germany so as to bring out the truth or otherwise of this statement.

56. Write a short essay on geographical factors in the localization of industry, with examples from the British Isles.

57. Consider the distribution of producing coalfields in Germany and its relation to natural facilities for distribution and to important industrial regions.

58. Describe briefly the chief natural regions that go to make up present-day France, paying special attention to those which tend respectively (a) to isolation, (b) to unification.

59. Enumerate the chief geographical characteristics of the Mediterranean Sea and its coastlands, and sketch briefly its present-day significance to Great Britain.

60. Indicate the chief geographical factors in the evolution of the North-Eastern iron and steel industry (*i.e.* Durham and N. Yorkshire).

61. Analyse the geographical position of *either* (a) Glasgow, *or* (b) Hull.

62. Describe comparatively the features of relief along the chief lines of communication between Belgrade and seas to the west, south, and east.

63. *Either*, Write notes on the trade relations of the *four* most populous cities of modern times on or quite near the coasts of the Mediterranean Sea, Rome and Istanbul being excluded.

Or, Discuss comparatively Rome and Istanbul as international centres.

64. Compare the prevalent winds of the eastern and western basins of the Mediterranean at the various seasons of the year.

65. Work out comparisons and contrasts *either* between Milan and Turin and between Genoa and Barcelona *or* between the various university cities of the Po basin.

66. Work out the resemblances and contrasts between the regions of southern France immediately east and west of the Rhone delta. Omit details of the delta itself and of Marseilles.

67. Write a short account of the physical geography of *one* of the following: The peninsula of Devon and Cornwall; the Weald; the Pennine Chain.

68. Write a careful account of *either* the Clyde industrial region *or* the West Riding of Yorkshire.

69. *Either*, Divide France into natural regions and write a brief account of the physical geography of each region.

Or, Write a brief account of the physical geography of the basin of *either* the Rhone, *or* the Danube.

70. Select any *three* of the following towns, and illustrate and account for its importance in the history of Europe: Cologne, Istanbul, Marseilles, Venice, Vienna.

71. Write an account of *either* the south Lancashire industrial region, *or* the agricultural areas of East Anglia.

72. If you were called upon to select a capital city for a United States of Europe (excluding Russia), which city would you select? Explain fully the reasons for your choice.

73. "Certain relief and structural feature which occur in the coastal areas of the British Isles are repeated on the opposite sides of the North Sea and English Channel." Illustrate this statement by a discussion of *three* different examples.

74. Give a geographical account of the textile industries of France and Germany *or* vine cultivation in the Mediterranean lands.

75. Suggest the leading geographical contrasts between Scotland and Ireland.
76. Give a reasoned account of *either* the cultivation of cereals in Great Britain *or* the growth of manufacturing industries in South-Eastern England.
77. Explain why Leeds has become of greater importance than York, Southampton than Winchester, and Crewe than Chester.
78. Compare and contrast *either* France and Italy *or* Switzerland and Czechoslovakia as regards resources, population, and economic development.
79. Examine the geographical factors which have led to the concentration of the population of Scotland in the Midland Valley.
80. Give an account of the location and development of the dairying industry of the British Isles.
81. Establish as many points of geographical resemblance as possible between the Midlands of England and the Midland Valley of Scotland.
82. Describe with reference to relief, climatic conditions, and mineral resources the distribution of the major agricultural and manufacturing industries in *either* the three counties east of the Pennines *or* the three counties west of the Pennines.
83. Describe the hinterlands of three great ports on or near the eastern side of the North Sea, so as to show how each of them has developed to its present-day importance.
84. With the aid of a sketch-map indicate the leading geographical features of *either* the Danube *or* the Volga basin.
85. Draw a sketch-map of the Mediterranean Sea to show the principal approaches by land and sea from countries beyond its borders.
86. Describe the climatic conditions of Spain and Portugal with special reference to the limits of the Mediterranean climate.
87. Show by a reasoned analysis how geographical conditions have affected the development of communications in Peninsular Italy.
88. Give a careful account of the geographical factors influencing the development of water power in North-Western Europe.
89. Compare and contrast, with special reference to their influence on the life and activities of man, the fiord coasts of Norway and Scotland.
90. Write a comparative account of dairy-farming in the Irish Free State, Denmark and Holland.
91. Analyse the position and importance of Liverpool, Hamburg, Southampton, and Rouen.
92. Give an account of the industrial development associated with *either* the Ruhr Coalfield *or* the Lanarkshire Coalfield.
93. Give a concise account of the geography of *either* Morocco *or* Algeria.
94. Show how climatic factors largely determine the arrangement of the zones of natural vegetation from Equatorial Africa to Northern Russia.
95. Consider how far the occupations and the distribution of population in the Scandinavian peninsula are related to its physical (including climatic) features.
96. Compare and contrast the situation and activities of Havre, Marseilles, and Southampton.
97. Write a comparative account of the physical and climatic conditions of Wales and East Anglia.
98. Describe carefully and explain the distribution of population in Northumbria.
99. Divide Germany into natural regions and justify your division.
100. Describe, and suggest reasons for, the distribution of wine-grape cultivation in the Mediterranean area.
101. Show how geographical conditions have affected the development of communications in the Balkan Peninsula.
102. Give a reasoned geographical account of the agricultural industries of *either* Egypt *or* the North Italian Plain.
103. Divide North Africa (Morocco, Algeria, and Tunisia) into geographical regions.
104. Indicate, and suggest geographical reasons for, the distribution of population in *two* of the following: the Spanish Meseta, Greece, Palestine.
105. Describe the results of glaciation to be observed within the area of North-Western Europe.
106. Examine the importance of the North Sea and of the Baltic Sea in the commerce of North-Western Europe.

107. Describe and explain by reference to geographical conditions the distribution of wheat, barley, oats, and rye cultivation in North-Western Europe.

108. Compare and contrast with special reference to their influence upon human activities the geographical settings in Switzerland and Denmark.

109. Give an account of the industrial development of Belgium *or* Yorkshire *or* the Northern Coalfield of France.

110. Give an account of the physical and economic geography of *either* Poland *or* Denmark.

111. What factors have influenced the development of industrial areas in the European part of U.S.S.R.?

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